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The Potential Effects of Cultured Shrimp Production on the Principal International Markets and Canadian Cold Water Shrimp Demand

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The Potential Effects of Cultured Shrimp Production on the Principal International Markets and Canadian Cold Water Shrimp Demand

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FOREWORD

This study was commissioned by the Economic and Commercial Analysis Directorate of the Canadian Department of Fisheries and Oceans to obtain a better understanding of our three principal markets the United States, Japan and Western Europe and a better appreciation of current trends in consumption between cultured and cold water shrimp.

PRÉFACE

Cette étude a été commandée par la Direction générale de l'analyse économique et commerciale du ministère des Pêches et des Océans du Canada afin de mieux connaître nos trois marchés principaux, ceux des États-Unis, du Japon et de l'Europe occidentale, et de mieux évaluer les tendances relatives actuelles de la consommation des crevettes d'élevage et d'eau froide.

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INTRODUCTION

Shrimp is the most important high-value seafood product entering world trade channels and has excellent potential as an export item and hard currency earner for countries with the requisite resources.

The catching and/or raising, processing and marketing of shrimp has grown to major importance during the past decade. The annual world production of shrimp, ocean-caught and farm-raised, was reported to have been about 1,744,000 metric tons (live weight basis) in 1983 and an estimated 2,100,000 tons in 1988. Nearly 100 countries contributed to the total. About 60 countries produced commercial quantities large enough to enter the international trade picture.

Demand for shrimp continues to grow as the three principal markets--the United States, Japan and western Europe--utilized about 54 percent of the world's shrimp production (live weight basis) in 1988 compared to 46 percent in 1983.

Ocean shrimp resources, for the most part, have reached their maximum annual production limits. There may be potential for expansion of some offshore resources such as in Southeast Asia and western Africa, but most other fisheries are fully utilized. Additional supplies have recently and will continue to come from shrimp farms. Cultured shrimp production is already altering the previously established characteristics of the principal shrimp markets and products and this will continue. The markets for cold-water shrimp are being affected as well by the farmed production but to a lesser degree than the markets for tropical shrimp.

SUMMARY AND CONCLUSIONS

- The catching and/or raising, processing and marketing of shrimp has grown to major importance during the past decade and is expected to continue to expand during the next decade as demand is rising worldwide.

- Ocean shrimp resources, in many regions, have reached their maximum annual production limits and new supplies are expected to come mostly from the expanding shrimp culturing industry.

- The world production of shrimp was about 2.1 million metric tons in 1988 and shrimp farms supplied an estimated 410,000 tons. The bulk of the farmed shrimp is produced in the tropical regions of the world, especially in South Asia and South America, and this will continue in the future.

- The production of the cold-water species increased almost annually from 1982 through 1988, while trawl-caught tropical shrimp has declined in volume since the mid-1980's. The North Atlantic catches increased yearly through the 1970's and early 1980's, peaked in 1985 and have since remained relatively stable at about 200,000 tons per annum.

- The three principal markets, the United States, Japan and western Europe, utilize currently about 60 percent of the world's shrimp production each year. However, this percentage is expected to increase over the next decade. Each market differs from the others relative to preferences shown for certain species and products.

- The United States has one of the largest domestic shrimp fisheries in the world, yet imported over 70 percent of its market needs in 1988 and 1989. The bulk of the imports are

tropical species which are generally preferred by the majority of the populace. Only select markets in the northeast and northwest regions exist for the cold-water shrimp products.

- The apparent usage of shrimp in Japan has grown dramatically in recent years and of the three principal markets, Japan has the highest per-capita consumption. Japan imports nearly 90 percent of its annual shrimp needs, mostly from South Asian countries. However, Japan does import significant volumes of North Atlantic pink shrimp each year, especially for the sashimi and sushi trade which requires top quality raw shrimp.

- The western European market relies on domestic landings, mostly cold-water species, and imports of both cold-water and tropical shrimp. The northern Europeans prefer the North Atlantic shrimp, while the southern Europeans purchase more tropical varieties. The demand for shrimp is rising in western Europe, with the heavy consumption period being between June and September each year.

- The world production of shrimp will continue to rise over the next decade as tropical shrimp farming expands to meet the world's growing demand. The production of ocean-caught tropical shrimp will recede as these fleets are gradually reduced because of the economic competition from cultured shrimp, and because of resource user conflicts and management constraints. The bulk of the increasing world production will be generated by the nations in the tropical regions with the requisite resources.

- The relatively high but restricted market demand for cold-water shrimp should keep the freezer-trawlers of the northern seas economically viable over the next several years, providing the resources maintain themselves and prices do not rise disproportionately from substitutable products.

- The future outlook for the demand for high quality cold-water shrimp appears to be very good. The rising production of cultured tropical shrimp will be required to maintain the worldwide needs of the growing population. Cold-water shrimp is, at times, competing with other varieties in certain markets, but it is also filling "niche" markets such as in northern Europe, the Japanese sashimi/sushi markets and seasonally in the northeast and northwest United States.

- It is recommended that the Canadian shrimp fishermen concentrate their efforts to produce only high quality frozen products for these select markets. Also, that the products be advertised and marketed as shrimp with unique characteristics, captured and handled with special procedures to maintain quality and flavor.

WORLD PRODUCTION

The world production of shrimp increased nearly every year through the 1960's and 1970's, until the 1979 to 1981 period when ocean catches began to decline. Annual production increased thereafter; about 23 percent between 1982 and 1988, primarily due to shrimp farming (Figure 1).

PRINCIPAL PRODUCING NATIONS

Annual landings by the principal shrimp producing nations (according to the Food and Agriculture Organization [FAO] of the United Nations and LMR) for the years 1983 through 1988 are shown in Table 1. China's production has increased significantly in recent years and further increases can be expected because of aquaculture expansion. Other noteworthy increases during this period may be seen in the volumes reported for Taiwan, Indonesia, Thailand, Philippines and Ecuador. Norway's production has declined sharply in recent years due principally to expanded fishing by other nations such as Greenland and Iceland and also to a reduction in the size of the shrimp resources in the North Atlantic Ocean.

An estimated 270,000 tons (live weight basis) of shrimp were produced worldwide by aquaculture techniques during 1986. An even greater volume (340,000 tons) was produced in 1987 as China, Ecuador and Taiwan expanded production; an estimated 410,000 tons were raised worldwide in 1988, and 500,000 in 1989.

PRINCIPAL MARINE SPECIES GROUPS

Shrimp, like crabs and lobsters, belong to a group of animals called crustaceans. Apart from minute one-celled marine

animals, crustacea constitute the most numerous animals in the sea. Of the several hundred different species of crustaceans known as shrimp, only about 35 are of major commercial importance.

There are two basic groups of marine shrimp (Table 3), which move through the world trade channels: the "cold-water" (northern) species, which inhabit the temperate oceanic waters, grow slowly and are small in size relative to tropical shrimp; and the "warm-water" (tropical) varieties which inhabit temperate and tropical coastal areas, mature rapidly and often grow large in size. The two groups are referred to as either shrimp or prawns, depending upon local preference. The scientific community usually calls the fresh-water species "prawns" and marine species "shrimp."

Most of the shrimp harvested in the world each year are the tropical and temperate species, known as penaeids. The Penaeidea made up about 85 percent of the total 1987 landings (Table 2). Growth in the production of the cold-water species (Caridea) is evident during this period; going from 232,000 tons (live weight) in 1982 to 308,000 tons in 1987. Most of this increase came from the pandalid fisheries in the North Atlantic Ocean.

Cold-Water Shrimp

The cold-water species are found in great quantities off the shores of the North Pacific and North Atlantic countries. They are heavily fished north of Japan, off Canada's east and west coasts, northwestern and northeastern United States, Iceland, Greenland, Norway and northern Europe (Figure 2, Table 4). Two genera dominate the catches of northern shrimp; Pandalus and Crangon (Table 2). Cold-water shrimp have been the preferred species in northern Europe for many years.

The major genus fished commercially in the North Pacific and North Atlantic is Pandalus (called "northern shrimp," "pink shrimp," as well as "deep-sea prawn," see Appendix 1), which is highly acceptable for human consumption despite its small size. Pandalids landed in the United States and Canada reach count sizes from 80 to 120 whole shrimp per kilogram. Advances in processing techniques and equipment have reduced processing costs and stimulated production in recent years. In the North Atlantic, shrimp factory trawlers are commonplace and they produce whole, frozen shrimp generally of high quality. Because of high quality and superior taste, cold-water shrimp are preferred over tropical species in northern Europe, are very popular in Japan and to a lesser degree, in the United States. In the United States, large volumes of pandalids are mostly marketed frozen (peeled and deveined, often cooked) for use in cocktails, soups, salads and other shrimp specialties.

Tropical Shrimp

The tropical (warm-water) or penaeid shrimp form the bulk of the commodity "shrimp" which enters world trade channels, and are sought after especially in the major markets of the United States and Japan. These species have a short life history. Wild shrimp reach full size and, for the most part, are harvested or die from natural causes within a year to a year and a half after being spawned. The primary penaeid species are found in the coastal waters of the tropical and temperate regions around the globe. They are large, easy to process and have well developed markets in the United States and Japan.

The principal genera, all in the family Penadidae, are Penaeus, Metapenaeus, Parapenaeopsis and Xiphopenaeus. For trade purposes, these and many others are accepted by most consumers, although there are differences in value depending upon origin, species, size, quality, product form and market preference.

INTERNATIONAL TRADE AND PRIMARY PRODUCTS

Shrimp are reported to be the most valuable seafood commodity flowing through the international trade channels. An estimated 750,000 tons (product weight) were traded internationally to all markets during 1989. At an average price of $10.00 per kilogram, the total value would have been about $US7.5 billion. The principal nations involved in the shrimp business in 1988 are shown in Table 5 and the principal products on page 10.

INTERNATIONAL TRADE

The international trade of frozen and canned shrimp flows almost entirely into three markets; the United States, Japan and western Europe. These three markets utilize well over one-half of the world's production each year and, therefore, must import large volumes to fill consumer demands (Table 6).

The United States and Japan import shrimp from many of the same producing countries and in some years, considerable competition for product develops between the two nations. Both countries are continuously seeking and developing new sources of supply, while trying to competitively maintain their current raw material sources. Japan moved ahead of the United States in the annual volume of imports in 1973. The United States regained the lead during 1983, only to lose it again in 1984. Japan has been the principal importer since 1985.

The leading exporter to the United States and Japan during 1989 was China (PR), followed by Thailand, Indonesia, India and Ecuador. China moved from eighth position in 1984 to first in 1989 and Thailand from sixth to second (Table 7). China, Ecuador and Taiwan are major producers and exporters of pond-raised

shrimp (Figures 3, 4 and 5). Exports from China are growing rapidly and are expected to total over 120,000 tons per year by 1990, mostly pond-raised shrimp. Taiwan's production declined sharply in late 1987 and into 1988 as bad weather and disease problems hit the shrimp farms. Low production continued into 1989 as many farms switched to finfish or eels or remained dormant.

The northern countries of western Europe, for the most part, prefer the smaller cold-water species of shrimp (pandalids, crangonids, etc.) and catch, or purchase from other producing nations, most of their product from the North Atlantic region. Tropical shrimp, which are imported into western Europe, come mostly from Africa and Southeast Asia, and more recently, South America. The whole red shrimp from Argentina were well accepted in Europe but due to a serious decline in the availability, production fell sharply in the Southwest Atlantic region in 1986 and 1987 and imports declined. Western European buyers are now investigating potential supplies of temperate and tropical species to fill the rising demand and have imported products recently from Ecuador, Brazil, Cuba and other countries in this region, as well as from South Asia.

PRIMARY PRODUCTS

Fresh and/or frozen shrimp, most often headless, shell-on or peeled (and deveined), account for the great bulk of shrimp products marketed in Japan, the United States and western Europe. Blocks (one- and two-kilogram and five-pound) and vacuum sealed plastic bags (one-kilogram and three-pound), for individually quick frozen (IQF) product, are the most common and widely accepted product forms for frozen shrimp. Sales of canned shrimp are a distinct second in volume to frozen products. Many regionally oriented specialty products, such as fresh shrimp, dried shrimp, smoked shrimp, breaded and battered shrimp and

shrimp paste, account for most of the remaining volume of shrimp products traded and consumed. Shrimp products made from extruded meat are becoming popular in some markets of the United States but surimi-based shrimp products are not well accepted. Some geographic areas, such as southern Europe, prefer whole shrimp (heads-on) over the other products. Most imports into Europe from Central and South America, as well as from the North Atlantic region, are whole shrimp.

The following product forms or conditions are the most commonly traded internationally:

Headless, shell-on, raw, frozen (green* headless)
Headless, cooked, peeled, frozen (C&P)
Headless, peeled, undeveined, raw, frozen (PUD)
Headless, peeled, deveined, raw, frozen (P&D)
Headless, peeled, deveined, cooked, frozen (CP&D)
Headless, cooked, peeled, canned
Whole, shell-on, raw, frozen
Whole, shell-on, cooked, unfrozen
Whole, shell-on, cooked, frozen

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* Refers to condition, not color.

PRINCIPAL SHRIMP MARKETS

Of the thousands of tons of shrimp which flow through international trade channels annually, the bulk of the product goes into or through the three principal markets mentioned; the United States, Japan and western Europe. Many developing countries ship shrimp into these markets to obtain hard currency.

THE UNITED STATES MARKET

Supplies

The United States, which annually utilizes approximately 25 percent of the world's production, is the largest national market for shrimp products. Despite heavy domestic production, the United States fishermen provide only about 25 to 30 percent of the national supply requirements. Large quantities of foreign-caught shrimp must be imported annually to supply this market. The apparent usage of shrimp products in 1989 was nearly 315,000 tons (product weight), of which 228,600 were imported.

- #### Domestic Landings

The annual production of shrimp in the United States has undergone some significant changes (Table 8). Domestic landings were climbing annually until 1972 when the production of tropical shrimp began to decline. For four consecutive years, the domestic output decreased. However, in 1976, landings surged upward and 1977 followed with a record production year of 130,800 tons (heads-off). Landings have averaged about 95,000 tons per year since 1978.

The total annual landings' volume is not expected to increase in the United States in the future, as nearly all known

shrimping grounds are fully or overharvested at this time. The fluctuations in annual landings of tropical shrimp are due primarily to the survival rates of the young shrimp each year. This is true of cold-water shrimp also, but cold-water varieties are more susceptible to overfishing and long-term changes in abundance and availability.

- Imports

The annual volume of imported shrimp products--nearly all frozen, either shell-on (raw) or peeled and deveined (cooked and uncooked)--rose steadily until 1971. From 1972 through 1981, the volume fluctuated rather widely, up one year and down the next. The annual imports leveled off in the area of 90,000 to 100,000 tons during that period, but rose sharply in 1982 and 1983 and again from 1985 through 1988. Imports by principal product type for the years 1976 through 1989 are listed in Table 9. Receipts of shell-on headless shrimp have tripled since 1979, whereas peeled shrimp imports have increased only 25 percent.

Countries in Latin America and Asia are the chief sources of shrimp products imported by the United States (Table 10). Producers in Central and South America market nearly all their production for export to the United States. The growth in exports from this region has increased significantly in recent years with the expansion of shrimp farming. A prime example is Ecuador whose annual exports have changed dramatically in recent years, as may be seen in Figure 4. Production and exports by Asian producers are still growing as shrimp farm expansion continues to accelerate in South Asia. Shipments from this region, for the most part, have been going to Japan, but sales to the United States and western Europe are gaining in importance.

- Cold Storage Holdings

The volume of frozen shrimp held in public cold storage in the United States is reported at the end of each month. Holdings tend to rise during the June through November period when domestic landings and imports are seasonally high, and decline from December through May when incoming supplies are low (Figure 6).

Holdings averaged about 23,900 tons per month during 1989; falling from 28,205 tons on January 1 to 24,026 at the end of June. The holdings rose about 5,160 tons during the June 1 through December 31 period and ended the year at 25,500 tons. Cultured shrimp production from many sources is available most of the year, which has reduced the need and expense of holding large volumes of frozen shrimp over extended periods.

- Total Supplies

Shrimp supplies are derived from domestic landings, imports and inventories or holdings of shrimp in storage. The domestic production has shown no growth since 1977 and has averaged about 89,900 tons annually since 1980. The increase in available supplies during the past several years has come from, and will continue to come from, imports, almost entirely farm-raised.

Demand

The demand for shrimp in the United States has been very strong in recent years (Figure 7) due to several factors: (1) abundant supplies, (2) weak prices, (3) increased marketing effort, (4) limited supplies of competitive products such as king crab and lobster, and (5) an overall increase in demand for all seafood products.

The apparent usage of shrimp is determined by the volume of domestic landings, volume of imports, withdrawal or additions to storage, less exports. The 1989 apparent usage, on a product weight basis, was about 314,700 tons; the highest annual consumption to date (Table 11), surpassing 1985 by 28 percent. There has been a 94 percent increase in usage since 1979.

Prices

The prices of shrimp, whether ex-vessel (fishermen's price), wholesale or retail, are related to the size of the individual shrimp, the species, color, origin, quality and condition (whole, headless, peeled, etc.), as well as available supplies.

Large shrimp bring the highest prices because they are usually in short supply relative to demand; they require less labor to process; and are more acceptable for institutional use (restaurants, etc.). The values of shrimp differ between sizes, i.e., 31/35 counts receive about 20 to 45 cents more per pound than 36/40 counts, and so on. The prices by size for a particular species tend to run in concert with one another and seldom do prices of a small size go higher than the next size larger (Figure 8, Table 12).

Shrimp prices in the United States followed a seasonal pattern of highs and lows. Their direction was the opposite of the volume of the domestic production of tropical shrimp which is at its peak in the summer and at the low point in the winter. Generally speaking, the highest prices were paid early in the year, from January through April. Import prices tend to follow a pattern similar to domestic prices, but in more recent years, the import prices appear to be leading the domestic.

Black tiger shrimp from South Asia have been imported into the United States for six or seven years. However, the volume

has increased substantially since the mid-1980's, initially from Taiwan, but more recently from Bangladesh, Indonesia, Thailand and other regional growers. This species has been fairly well accepted in this market but it may be because of the low prices. The wholesale prices of Asian black tigers have been consistently below those of other products of similar size and condition (Figure 9, Table 13) in the United States market.

Expanding imports of semi- or non-seasonal pond-raised shrimp have reduced the magnitude of the seasonal undulations in prices, as well as lowered them. The dependability of supply from shrimp farms is increasing and this will further reduce the sharp swings in price, to the benefit of marketers and consumers.

The general trend in shrimp prices is about the same in Japan as it is in the United States, indicating that shrimp is an international commodity. What affects prices in one market will to some degree affect the other markets.

THE JAPANESE MARKET

Supplies

- Domestic Landings

The domestic landings of shrimp in Japan peaked in 1963 at 50,000 tons (heads-off weight) and thereafter, production drifted downward almost annually through 1988 (Table 14). During the past 10 years, some of Japan's traditional shrimping grounds off the coasts of China, USSR and Alaska have been closed to them. The annual landings have leveled off at about 31,000 tons (average 1979-1988) and are not expected to increase or decrease significantly in the future.

- Imports

The Japanese rely on foreign suppliers to fill 90 percent of their market needs. They have invested in numerous joint ventures in shrimp-producing enterprises in South Asia, Oceania, South America and Africa. The major suppliers to Japan for the period 1984 through 1989 are shown in Table 15.

The principal importers of shrimp into the Japanese market are the trading companies which have offices in most of the shrimp-producing countries and are able to develop and maintain a close relationship with the farmers, fishermen, processors and bankers. Thus, the trading companies exercise a high degree of influence over the shrimp producers in Bangladesh, India, Indonesia, Malaysia, Philippines, Taiwan, Thailand, Vietnam and other countries in the region.

In addition to investing in foreign shrimp projects and maintaining a close relationship with the producers, the Japanese pioneered the development of shrimp culture techniques and exported the knowledge to many nations which are now producing shrimp for the Japanese and other world markets.

The imports of cold-water shrimp into Japan, particularly from Greenland and other North Atlantic countries, have been increasing in recent years, going from about 15,000 tons in 1985 to nearly 28,000 tons in 1989 (Table 16).

- Cold Storage Holdings

The inventory of frozen shrimp in Japan grew steadily from mid-1985 through mid-1989 (Figure 10). Some of this buildup was due to speculation on both prices and currencies or exchange rates. By mid-1989 the volume had reached 100,000 tons or a 4-month supply at the current consumption rate. High freezer

costs, deteriorating quality and low prices for replacement products brought about a change in thinking recently, and holdings were reduced by 20 percent through the latter half of 1989. As the Japanese moved back into the market during early 1990, world supplies were relatively low and prices moved sharply higher.

Demand

The apparent usage of shrimp in Japan has been growing annually since 1981, going from 179,000 tons to 300,000 tons during 1989 (Table 14). The per-capita consumption has risen nearly three-quarters of a kilogram during this period and currently is the highest of the three principal markets. The primary periods of heavy consumption are during Golden Week in April, the summer months and during the holiday period in December each year.

Prices

Shrimp prices in Japan tend to follow the trends of the world market but with occasional deviations which occur in the national market. The Japanese preference for certain species over others, and large shrimp over smalls or mediums, used to affect prices to a different degree than in other markets; such as the United States where substituting species to obtain a lower price is common. These preferences have begun to erode in some instances, as may be noted with the black tiger experience.

The black tiger shrimp were introduced into the Japanese market several years ago at prices below the traditional species. Initially they were used in tempura dishes where species were not a factor. The taste and the low price encouraged consumption and because of the brilliant red on white color after cooking, black tigers became increasingly popular. The Japanese, for the

most part, prefer color in their cooked shrimp, whereas most Americans like the white meat.

As prices moved higher, shrimp-farm production increased to meet the growing demand. Production expanded in Taiwan and eventually throughout most of South Asia. This additional volume, along with rising production of Chinese whites, soon saturated the Japanese market and prices for most species declined (Table 17A and B). The overflow was then directed to the United States market, again at low prices to gain market share. These products are more in demand now and their values have increased in recent months.

As mentioned previously, the Japanese purchase most of their cold-water shrimp supplies from the North Atlantic producers and exporters. The Japanese prefer the whole, raw, frozen-at-sea shrimp because of the usual high quality. It is commonly consumed in the raw form as sashimi or sushi. The shore-frozen imports are low in volume and in price. Most of this product goes to processors as sometimes the color is poor and the condition or quality less than desirable. Comparative prices, on the Tokyo wholesale market in yen per kilogram, for selected sizes of whole shrimp (P. borealis) are presented below:

Count Size Pieces/ Kilogram	March 1989		March 1990	
	Frozen at sea Canadian	Shore Frozen Canadian	Frozen at sea Canadian	Frozen at sea Greenland
40-60	-	-	-	2,975
50-70	2,350	-	2,100	2,875
60-80	1,800	1,300	-	-
70-90	900	550	-	1,100
90-120	700	-	-	800

Source: Tokyo Wholesaler

THE WESTERN EUROPEAN MARKET

Supplies

The Europeans rely on domestic landings, mostly cold-water species from the North Atlantic Ocean, and imports to supply market needs. Some temperate species are found along the coasts of Spain and the northern Mediterranean Sea but the largest volumes of domestic shrimp are the pandalids and Crangons from the North Atlantic. Table 18 shows the annual landings of shrimp by the principal countries in Europe from 1983 through 1988.

The European Economic Community (EEC) imports large volumes of cold-water shrimp annually from Norway, Iceland, Greenland and the Faeroe Islands. In addition, shrimp has been imported from countries in Africa and South Asia for several decades. A high percentage of the imports of small shrimp, cold-water or warm-water species, are reprocessed and exported to other countries within and outside the EEC. Denmark exports almost as much shrimp as it imports each year (Table 19). There is a substantial amount of shuffling of products between and among the various nations of western Europe, as well as imports from outside the region, which tends to confuse the true market picture.

Because of former colonial ties, the French tend to favor tropical shrimp from Africa (Senegal, Gabon, Madagascar and Sierra Leone), the British from South Asian countries (India, Pakistan and Bangladesh) and the Spanish from North Africa and Central and South America. West Germany imports mostly from other EEC countries, Iceland, Norway and the Faeroes.

Apparent Usage

The demand for shrimp in western Europe has been rising also, but at a slower pace than the other two markets. The total annual usage increased from about 120,000 tons (product weight) in 1983 to about 190,000 in 1988 (Table 20). Preliminary import data suggests 1989 usage should reach 200,000 tons for the year.

The product forms and species preferred in western Europe differ to some degree from those consumed in Japan and the United States where processors and restaurateurs like the raw headless, shell-on products. In western Europe, the preference, depending upon the country or ethnic background, is for whole raw shrimp or cooked and peeled products. Frozen headless shrimp is not yet well accepted in most national markets. The southern Europeans (Italy, Spain, etc.) traditionally buy the whole raw shrimp, medium sizes. In the northern countries the preference is for the small cold-water shrimp, whole frozen or cooked and peeled. Consumers in the north generally prefer the cold-water species because of its delicate flavor and firmness of the flesh, but price considerations may move some buyers toward the tropical species. The high consumption period is during the summer or vacation months.

The market for cultured shrimp, whole raw frozen products, is developing in western Europe and is expected to expand gradually over the next decade, first in southern Europe, then gradually northward. Exports from Brazil and Ecuador are finding increased interest in Spain, one of the principal seafood-consuming nations in Europe. Black tiger shrimp from South Asia are making headway into France and Spain, while white shrimp from China first showed in the United Kingdom imports in 1988. Some press reports indicate that when the cold-water shrimp become too high in price, some processors will switch to the small tropical

shrimp of South Asia, but generally, the consumers prefer the northern shrimp.

OTHER MARKETS

Other nations which are importing shrimp for local consumption are Canada, Australia, Singapore, Hong Kong and New Zealand. Most of the Caribbean Island nations which cater to the tourist trade, import frozen shrimp products. The increasing tourist business in Mexico and Brazil is siphoning product which would have been exported just a few years ago. Canada utilized about 20,000 tons of shrimp last year, mostly frozen products from the United States, Hong Kong, Mexico, Cuba, Ecuador and the USSR. The large population of Chinese immigrants in British Columbia has encouraged shipments of Chinese white shrimp, through Hong Kong, to that region. Australia imports almost as much as it exports each year, usually products and types of shrimp not domestically produced. Usage in all markets is increasing because of improved holding facilities and shipping systems, availability of product at relatively low prices and population growth.

WORLD PRODUCTION PROJECTIONS AND MARKET EFFECTS

WORLD SHRIMP PRODUCTION PROJECTIONS

The annual world production of shrimp, ocean-caught and farm-raised, was reported to have been 2,048,000 metric tons (live weight basis) during 1987 and an estimated 2,100,000 tons during 1988. About 60 countries produced commercial quantities large enough to enter the international trade picture. Production is projected to increase to about 2,700,000 tons by the year 2000 (Table 21).

The world population was estimated to have been about 5.1 billion in 1988 and is expected to increase to about 6.2 billion by 2000. The supplies of shrimp available in 1988 provided about 0.411 kilograms per individual. Allowing for a very conservative rise in apparent per-capita consumption over the next 11 years, the supplies of shrimp necessary to fill world demand in the year 2000 will be about 2,700,000 tons.

Ocean-caught shrimp resources, for the most part, have reached their maximum annual production limits. Additional supplies needed to fill future demand will have to come from shrimp farms. Cultured shrimp will play an increasingly important role in the major markets and ocean-caught shrimp a lesser role as production costs will bring about a gradual attrition of many shrimping fleets, especially those in the tropical regions of the world. The relatively high but restricted demand for cold-water shrimp should keep the freezer trawlers in the northern seas economically viable over the next decade providing prices do not deviate extensively from substitutable products.

Principal Countries

The world production of cultured shrimp is growing at a rapid pace; going from less than 1 percent of the world's annual supplies in 1980, to an estimated 20 percent in 1988 and a projection of nearly 45 percent by 2000. The principal producing nations today are the People's Republic of China and Ecuador. However, other nations, such as Indonesia, Thailand, Philippines, India, Bangladesh, several in Central and South America, Australia and some African countries, are planning significant expansions in shrimp farming. Taiwan, which has been a major producer, is trying to recover from serious setbacks in pond culture in 1988. This rising production is necessary as the world's population expands, requiring additional product. The demand for all seafoods is increasing rapidly as consumers seek more low-fat foods and shrimp is an ideal product for this purpose.

Future increases in cultured shrimp production will come from countries in the tropical regions of the world such as South Asia; from Thailand, Indonesia, Vietnam, India, Bangladesh, the Philippines and Myanmar (Burma). China's production will continue to rise as farms are developed in the southern regions where several crops a year can be produced. The greatest potential area in South America is in Brazil which has extensive regions available for development and an abundance of low cost labor. Central Africa is not expected to come on-stream in any significant volume for many years. The United States will never be a major producer of cultured shrimp because of the high cost and demand for coastal property, high labor costs and its temperate climate. The countries in the tropical zones which have the lowest operational costs are today and will continue to be the dominant producers of shrimp in the future.

Table 22 presents estimates of the world shrimp production to the year 2000 for the principal shrimp-producing nations, along with estimates of annual production by farming methods and by ocean fishing, which are shown in Figure 11.

OUTLOOK FOR SUPPLIES AND USAGE IN THE PRINCIPAL MARKETS

Of the thousands of tons of shrimp which flow into and through international trade channels, approximately 60 percent ends up in the three major markets; the United States, Japan and Europe. At present, western Europe purchases small quantities of cultured shrimp, while the United States and Japan are, and will continue to be, major buyers and consumers of these products. Western Europe will follow soon as is evidenced by recent purchases of Asian black tiger and Chinese white shrimp.

The combined usage of shrimp (product weight) in the three principal markets during 1980 was about 449,100 tons or nearly 45 percent of the world production. In 1988 it had risen to 773,000 tons or 61 percent; by 2000 these markets will require nearly 80 percent of the expected production, unless shrimp farming expansion increases much faster than the anticipated usage. Table 23 shows the combined usage projected to the year 2000 for the three markets, on a product weight or heads-off basis, and the expected production. Modest increases in the per-capita consumption were used in the projections (United States and Japan, 0.064 kgs per year and 0.023 for the EEC).

CANADA - SHRIMP PRODUCTION AND MARKET PROSPECTS

The small pink shrimp (Pandalus borealis), or great northern prawn as it is sometimes called, is the dominant species of shrimp taken from the offshore waters of the Canadian eastern seaboard. This species is relatively abundant in the North Atlantic Ocean from Baffin Bay to the Gulf of Maine and from the

Gulf of St. Lawrence to the Barents Sea. The Canadian fishery takes place in the western Atlantic in the Maritimes coastal region. Canada's annual east coast production was relatively steady at 13,000 tons per year until 1986 when landings began to increase (Table 24). Not included in these data are catches by foreign vessel, joint venture operations which periodically fish in the Canadian waters. Landings on the Pacific coast totaled 2,000 to 3,000 tons per year in recent years.

As with most shrimp fleets which fish for the northern pink shrimp, Canadians usually process their catch in the whole, shell-on, raw or cooked and frozen form. Some whole shrimp may be cooked onboard the catcher vessel at sea, whereas the cooked and peeled products are processed in shore-based plants.

A high percentage of the processed shrimp is exported to the two regional markets, the United States and western Europe. The principal importer in Europe is Denmark, which is a major reprocessor and exporter of shrimp (Table 25). Following Denmark are the United Kingdom and France, with lesser quantities being exported to Switzerland and West Germany. About 3,000 tons, mostly whole frozen shrimp, were shipped to Japan in 1989, compared to about 1,600 in 1988.

By exporting to these markets, the Canadian products must compete in quality and price with the domestically produced shrimp, as well as imports from the major pink shrimp producers such as Greenland, Iceland and Norway. Fortunately, the cold-water shrimp are highly prized in northern Europe, and in special markets in the United States and Japan, because they are usually of excellent quality and their flesh firm and tasty.

The northern pinks are preferred in these select markets and generally command higher prices than warm-water shrimp of comparable size and quality (Figure 12). The production of

pandalids is seasonal and therefore, most of the catches enter the markets during the summer months. The lack of product during the off-season or exceptionally high prices encourages processors and wholesalers to purchase small Asian shrimp as a substitute. However, the majority of the northern Europeans show a definite preference for the fresh and/or frozen North Atlantic pink shrimp over the more bland and less flavorful warm-water varieties or canned shrimp from South Asia.

Because of the desire by some Japanese consumers to eat raw shrimp, the whole, high quality, frozen-at-sea cold-water shrimp from the North Atlantic Ocean is actively sought after and commands high prices on the Tokyo market, prices similar to many species of large, headless, tropical shrimp.

Canadian-produced northern pink shrimp of high quality will continue to find a ready market in northern Europe and in select markets in Japan and the United States. Prices for cold-water shrimp should remain above other similar products in these markets but if prices become too high, or the price spread too wide, some consumers may seek alternative products.

The uniqueness of the northern pink shrimp sets it above other small shrimp in the minds of certain consumers. This preference should be promoted in marketing and advertising of this product, especially into Japan and northern Europe. The shrimp trawlers should target their products for these two markets and handle their catches accordingly.

EFFECTS OF EXPANDING SHRIMP PRODUCTION ON OTHER SHELLFISH PRODUCTS IN THE PRINCIPAL MARKETS

Generally, shrimp does not compete in the markets with other shellfish such as lobster, scallops or oysters. The price of shrimp or other product is determined in its own market by the

supply and demand of that product. However, price and availability of one product may affect the price of another product if it is substitutable. Seafood products may be considered substitutable when an increase (or decrease) in the price of one increases (or decreases) the demand for the other.

This is a common occurrence between similar species, such as brown shrimp and white shrimp, but it is not common between dissimilar species such as lobster and shrimp.

For example, tropical shrimp produced in shrimp farms are definitely substitutable in the marketplace with tropical shrimp taken from the ocean by shrimp trawlers. This is very apparent when examining recent New York wholesale prices of farm-raised white shrimp from Ecuador with a corresponding size of trawl-caught brown shrimp from the Gulf of Mexico (Figure 13, Table 26). The prices of these two similar species are consistently together throughout the year. However, when comparing the wholesale prices of frozen spiny lobster tails with large, frozen headless shrimp in the same market (Figure 14, Table 27), the price trends are quite dissimilar or apparently unrelated. Comparisons of other shellfish prices with shrimp would probably yield similar results.

Most seafood wholesalers and retailers (whether market operators or restaurateurs), offer their customers a selection of products or dishes to purchase. During the "off-season," a customer may tend to be more selective as to cost or resale value but most consumers of shellfish buy what they want regardless of price. Shellfish consumers sometimes switch to other products because it may be fresh, local and in-season, or just to obtain variety; but not usually because of price.

If the price of a particular shellfish product becomes excessively high or "out of line" with other products,

replacements soon enter the market. For example, when king crab became very high in price, consumers soon switched to snow crab or queen crab, etc., and eventually to crab-based surimi products. The unavailability of king crab supplies and high prices did not bring about an increase in the demand for shrimp. The demand for shrimp has risen because expanding supplies have lowered the prices and made the product available all year. King crab producers still sell all the product they can catch and prices remain high. The competition between dissimilar shellfish species because of price is believed to be minimal.

TABLES

TABLE 1

WORLD SHRIMP PRODUCTION BY PRINCIPAL NATION
1983-1988

(Thousands of Metric Tons/Live Weight)

Nation	1983	1984	1985	1986	1987[1/]	1988[2/]
China (PR)	186	207	229	220	232	260
India	193	203	232	215	217	210
Indonesia	138	133	144	157	168	180
Thailand	140	135	126	139	150	170
United States	120	145	153	183	165	150
Taiwan	87	99	109	138	158	120
Philippines	40	52	62	72	68	80
Mexico	77	76	75	73	84	80
Ecuador	45	40	36	53	79	80
Greenland	41	47	58	69	75	79
Bangladesh	50	61	70	73	74	78
Malaysia	77	70	69	73	70	75
Brazil	49	59	68	69	64	70
Vietnam	49	53	54	55	56	65
Japan	64	63	55	48	47	47
Norway	78	84	91	57	42	40
Canada	15	13	14	16	27	34
Iceland	13	24	25	36	39	30
Others	282	301	311	256	233	252
Total	1,744	1,865	1,981	2,002	2,048	2,100

1/ Preliminary.

2/ Preliminary, with estimates.

Sources: United Nations, various national statistical reports, and LMR Fisheries Research, Inc. (LMR)

TABLE 2

WORLD SHRIMP PRODUCTION BY MAJOR FAMILY GROUPS

1982-1987

(Thousands of Metric Tons/Live Weight)

Section/Family	1982	1983	1984	1985	1986	1987[1/]
CARIDEA						
Pandalidae	154	186	193	226	228	237
Palaemonidae	14	15	15	15	15	15
Crangonidae	53	54	59	53	31	29
Others	11	22	30	16	19	27
Subtotal	232	277	297	310	293	308
PENAEIDEA						
Penaeidae[2/]	1,247	1,239	1,327	1,400	1,471	1,515
Sergestidae	226	228	241	271	238	225
Subtotal	1,473	1,467	1,568	1,671	1,709	1,740
GRAND TOTAL	1,705	1,744	1,865	1,981	2,002	2,048

1/ Preliminary

2/ Includes others.

Sources: FAO and LMR, Inc.

TABLE 3

SHRIMP SPECIES OF COMMERCIAL IMPORTANCE

Common Shrimp Name	Scientific Name	Ocean Area
	Cold-Water (Northern)	
Northern Pink	Pandalus borealis[1/]	Northern Oceans
Common	Crangon crangon[1/]	Atlantic, Northeast
	Warm-Water (Tropical)	
Northern Pink	Penaeus duorarum	Atlantic, West
Southern Pink	P. notialis	Atlantic, Central
Northern Brown	P. aztecus	Atlantic, West
Southern Brown	P. subtilis	Atlantic, West
Northern White	P. setiferus	Atlantic, West
Southern White[2/]	P. schmitti	Atlantic, West
Pink Spotted[2/]	P. brasiliensis	Atlantic, West
Pacific White[2/]	P. vannamei	Pacific, East
Blue[2/] (White)	P. stylirostris	Pacific, East
Crystal (Pink)	P. brevirostis	Pacific, East
Yellow (Brown)	P. californiensis	Pacific, East
Western White	P. occidentalis	Pacific, East
Kuruma[2/]	P. japonicus	Indo-Pacific
Giant Tiger[2/]	P. monodon	Indo-Pacific
Banana[2/]	P. merguiensis	Indo-Pacific
Green Tiger	P. semisulcatus	Indo-Pacific
Indian White[2/]	P. indicus	Indo-Pacific
Chinese White[2/]	P. orientalis	Indo-Pacific
King	P. latisulcatus	Indo-Pacific
Brown Tiger	P. esculentus	Indo-Pacific
Seabob	Xiphopenaeus kroyeri[1/]	Atlantic, West
Argentine Red	Pleoticus muelleri[1/]	Atlantic, Southwest
Paste	Acetes japonicus[1/]	Indo-Pacific

1/ Principal species in genus.

2/ Principal cultured species.

TABLE 4

NORTH ATLANTIC SHRIMP (PANDALUS SPP.) CATCHES

1977-1987

(Metric Tons - Live Weight)

Year	Northwest	Northeast	Total
1977	50,538	35,434	85,972
1978	54,235	38,249	92,484
1979	55,114	42,285	97,399
1980	65,287	62,846	128,133
1981	55,778	56,843	112,621
1982	57,413	72,899	130,312
1983	60,523	109,670	170,193
1984	55,062	127,327	182,389
1985	67,931	141,823	209,754
1986	80,210	117,745	197,955
1987	90,426	109,867	200,293

Source: United Nations, FAO

TABLE 5

WORLD SHRIMP TRADE, 1988
Principal Nations

Producers	Importers	Exporters
China (PR)	Japan	China (PR)
India	United States	India
Indonesia	Denmark	Ecuador
Thailand	United Kingdom	Thailand
United States	France	Greenland
Taiwan	Spain	Indonesia
Philippines	Italy	Denmark
Mexico	Sweden	Mexico
Ecuador	Netherlands	Taiwan
Greenland	Belgium	Philippines

Source: LMR, Inc.

TABLE 6

IMPORTS OF SHRIMP
INTO THE UNITED STATES, JAPAN AND WESTERN EUROPE
1975, 1980, 1988

(Thousands of Metric Tons/Product Weight)

From the Top Ten Exporting Countries[1/]

Origin	1975	Origin	1980	Origin	1988[2/]
India	43.9	India	58.1	China (PR)	87.8
Mexico	38.1	Mexico	38.2	India	53.5
Indonesia	23.2	Indonesia	33.2	Ecuador	49.8
China PR	19.2	China PR	28.2	Thailand	47.7
Senegal	12.3	Faroe Is[3/]	26.3	Greenland	44.2
Thailand	10.7	Senegal	23.4	Indonesia	40.8
Taiwan	7.8	Thailand	20.6	Mexico	31.3
Australia	5.9	Greenland	19.7	Taiwan	28.8
Hong Kong	5.9	Bangladesh	13.6	Philippines	22.4
Greenland	5.0	Taiwan	11.7	Vietnam	17.8
Others	104.7	Others	97.7	Others	233.7
Total	276.7	Total	370.7	Total	657.8
Live Weight	404.3		541.6		961.0

1/ Does not include exports to other markets.
2/ Preliminary.
3/ May include some Norway shrimp.

Sources: Various national statistical reports consolidated and modified by LMR, Inc.

TABLE 7

IMPORTS OF SHRIMP
INTO THE UNITED STATES AND JAPAN
1975, 1984, 1989
(Thousands of Metric Tons/Product Weight)

From the Top Ten Exporting Nations[1/]

Origin	1975	Origin	1984	Origin	1989[2/]
India	43.4	India	49.5	China (PR)	84.0
Mexico	38.1	Mexico	39.3	Thailand	60.4
Indonesia	21.8	Indonesia	25.0	Indonesia	56.2
China (PR)	10.3	Taiwan	24.8	India	42.8
Thailand	10.1	Ecuador	21.5	Ecuador	37.3
Taiwan	5.9	Thailand	15.0	Mexico	28.5
Hong Kong	5.1	Australia	12.0	Philippines	25.0
Australia	5.1	China (PR)	11.1	Vietnam	16.8
Panama	4.4	Philippines	6.2	Greenland	16.3
Ecuador	3.8	Vietnam	5.1	Taiwan	12.2
Other	57.0	Other	115.4	Other	112.5
Total	205.0	Total	324.9	Total	492.0
Percent Increase from 1975			58.5		140.0

1/ Does not include exports to Europe or other areas.
2/ Preliminary
Source: National reports and LMR, Inc.

TABLE 8

UNITED STATES DOMESTIC SHRIMP LANDINGS

1976-1989

(Thousands of Metric Tons/Heads-off Weight)

Year	Northern	Tropical	Total
1976	43.9	67.5	111.1
1977	50.0	80.8	130.8
1978	40.4	76.0	116.4
1979	24.8	68.5	93.3
1980	25.5	68.8	94.3
1981	18.1	81.3	99.4
1982	12.5	67.2	79.7
1983	6.4	64.2	70.6
1984	6.3	79.0	85.3
1985	9.7	84.3	94.0
1986	18.9	93.5	112.4
1987	21.5	80.3	101.8
1988	21.0	72.0	93.0
1989[1/]	22.5	76.4	98.9

1/ Preliminary

Sources: U.S. Department of Commerce and LMR, Inc.

TABLE 9

UNITED STATES SHRIMP IMPORTS, BY TYPE
1976-1989
(Thousands of Metric Tons/Product Weight)

Year	Shell-on Headless	Peeled[1/]	Canned	Breaded	Total
1976	58.8	44.0	1.1	0.4	104.3
1977	57.1	44.8	1.3	0.3	103.5
1978	46.0	42.6	1.3	0.2	90.1
1979	56.0	43.7	2.0	0.2	101.9
1980	63.0	34.6	1.9	0.1	99.6
1981	64.0	33.8	2.0	1.4	101.2
1982	83.9	36.2	2.4	1.8	124.3
1983	98.4	49.3	6.0	1.2	154.9
1984	102.4	46.7	6.2	0.1	155.4
1985	105.5	49.7	7.8	0.3	163.3
1986	118.9	55.4	7.2	0.1	181.6
1987	140.9	68.1	7.8	0.6	217.4
1988	163.1	58.9	6.4	0.6	229.0
1989[2/]	169.3	53.9	5.1	0.3	228.6

1/ Includes raw, cooked, whole and other.
2/ Preliminary

Source: U.S. Department of Commerce

TABLE 10

UNITED STATES IMPORTS OF SHRIMP BY PRINCIPAL COUNTRIES
1984-1989

(Thousands of Metric Tons/Product Weight)

Origin	1984	1985	1986	1987	1988	1989[1/]
China (PR)	1.4	3.1	9.4	19.2	47.4	48.6
Ecuador	21.1	19.9	28.1	46.0	47.3	37.1
Mexico	37.1	30.6	33.8	39.1	28.9	28.0
India	10.5	10.9	11.1	12.9	14.6	13.1
Thailand	8.2	11.1	10.9	10.9	10.8	21.6
Brazil	9.0	11.5	9.0	7.5	9.1	7.5
Taiwan	8.3	13.4	15.7	16.8	7.9	3.3
Panama	7.4	8.9	9.9	7.5	6.7	8.0
Pakistan	4.9	5.1	6.5	8.0	6.6	5.0
Bangladesh	1.5	1.9	2.8	4.2	5.3	5.4
Honduras	2.4	2.4	2.4	3.6	4.2	3.4
Venezuela	2.3	3.0	4.1	2.7	4.1	5.6
El Salvador	3.8	2.8	3.4	3.3	3.7	2.9
Peru	3.0	2.1	1.7	2.7	1.9	1.7
Canada	1.3	1.9	1.6	3.2	2.4	2.0
Norway	5.8	7.2	3.1	2.0	0.6	0.1
Other	27.2	27.4	27.9	27.8	27.5	35.3
Total	155.2	163.2	181.4	217.4	229.0	228.6

1/ Preliminary

Source: U.S. Department of Commerce

TABLE 11

UNITED STATES APPARENT USAGE OF SHRIMP
1976-1989
(Thousands of Metric Tons/Product Weight)

Year	Landings	Imports	Exports	Holdings Change	Apparent Usage	Per-Capita (Kilograms)
1976	111.4	104.3	-23.7	- 7.7	184.3	0.86
1977	130.8	103.4	-26.0	- 6.0	202.2	0.91
1978	116.6	90.0	-31.2	13.4	188.8	0.86
1979	93.3	101.9	-23.1	-10.3	161.8	0.72
1980	94.3	99.5	-18.2	4.4	180.0	0.77
1981	99.3	101.1	-19.8	5.8	186.4	0.82
1982	79.7	124.3	-16.9	3.3	190.4	0.82
1983	70.6	154.9	-16.3	- 5.9	203.3	0.86
1984	85.3	155.4	-12.1	3.9	232.5	1.00
1985	94.0	163.3	-12.1	0.2	245.4	1.04
1986	112.4	181.5	-14.5	0.7	280.1	1.13
1987	101.8	217.4	-15.3	- 3.3	300.1	1.25
1988	93.0	229.0	-15.8	2.4	308.6	1.27
1989[1/]	98.9	228.6	-15.5	2.7	314.7	1.28

1/ Preliminary

Sources: U.S. Department of Commerce and LMR, Inc.

TABLE 12

ECUADOR WHITE SHRIMP PRICES
NEW YORK WHOLESALE MONTHLY AVERAGES, DOLLARS PER POUND
FROZEN, RAW HEADLESS, SHELL-ON

Size Count	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
						1987						
Under 15	8.05	8.21	8.40	8.75	9.45	9.65	9.66	9.65	9.65	9.80		9.15
16/20	7.41	7.44	7.67	8.20	8.62	8.73	8.61	8.43	8.00	7.75	7.73	7.80
21/25	6.46	6.25	6.21	6.49	6.82	6.54	6.31	6.30	6.41	6.50	6.46	6.51
26/30	5.64	5.44	5.29	5.41	5.58	5.31	5.15	5.05	5.08	5.11	5.03	5.14
31/35	4.64	4.41	4.31	4.44	4.61	4.35	4.15	4.14	4.20	4.19	4.13	4.18
36/40	4.33	4.09	4.04	4.15	4.24	3.79	3.54	3.50	3.54	3.44	3.33	3.39
41/50	4.28	4.00	3.95	3.99	4.03	3.63	3.26	3.15	3.19	3.06	2.95	2.96
51/60	3.85	3.79	3.82	3.89	3.91	3.54	3.17	3.10	3.09	2.91	2.80	2.76
61/70				3.40	3.50	3.25	3.05	2.98	2.90	2.82	2.70	2.64
						1988						
Under 15	9.18	9.35	9.35	9.29	9.25	9.25	9.25	9.40	9.50	9.50	9.58	9.56
16/20	7.90	8.05	8.16	8.23	8.17	8.18	8.21	8.39	8.35	8.30	8.39	8.40
21/25	6.73	7.04	7.39	7.51	7.53	7.54	7.60	7.72	7.61	7.64	7.68	7.66
26/30	5.26	5.61	6.02	6.25	6.17	6.01	5.98	5.70	5.45	5.68	5.92	5.98
31/35	4.29	4.61	5.01	5.25	5.15	5.01	4.95	4.54	4.20	4.56	4.88	4.86
36/40	3.59	3.74	4.09	4.25	4.14	4.01	3.96	3.76	3.53	3.79	4.03	4.08
41/50	3.01	3.13	3.21	3.27	3.17	3.24	3.31	3.41	3.28	3.55	3.87	3.95
51/60	2.70	2.70	2.78	2.84	2.77	2.83	2.89	2.82	2.80	3.00	3.20	3.26
61/70	2.60	2.60	2.60	2.55	2.44	2.45	2.45	2.45	2.45	2.65	2.76	2.80
						1989						
Under 15	9.50	9.43	9.30	9.26	9.24	9.27	9.40	9.34	9.21	8.81	8.55	7.98
16/20	8.33	8.17	8.00	7.95	7.63	7.60	7.58	7.33	6.95	6.66	6.48	6.19
21/25	7.56	7.27	6.68	6.02	5.62	5.55	5.60	5.38	5.13	5.09	5.18	5.18
26/30	5.71	5.54	5.39	5.18	5.08	5.00	5.00	4.75	4.55	4.51	4.89	4.94
31/35	4.66	4.51	4.42	4.30	4.27	4.30	4.56	4.45	4.35	4.38	4.66	4.70
36/40	3.95	3.91	3.95	3.86	4.03	4.10	4.28	4.10	3.84	3.80	3.80	3.78
41/50	3.78	3.74	3.75	3.71	3.78	3.85	4.07	3.95	3.71	3.65	3.63	3.58
51/60	3.16	3.15	3.15	3.11	3.17	3.25	3.39	3.31	3.23	3.20	3.23	3.25
61/70	2.74	2.74	2.75	2.65	2.78	2.85	2.91	2.91	2.85	2.85	2.92	2.95

TABLE 13

ASIAN BLACK TIGER[1/] SHRIMP PRICES
NEW YORK WHOLESALE, MONTHLY AVERAGES, DOLLARS PER POUND
FROZEN, RAW HEADLESS, SHELL-ON

Size Count	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
						1987						
Under 15	7.50						9.03			8.58	8.30	8.38
16/20	6.40	6.45	6.70				7.83	7.68	7.55	7.15	6.78	6.75
21/25	5.75	5.70	5.75	5.75		6.05	5.83	5.70	5.75	5.65	5.53	5.50
26/30	5.20	5.23	5.25			5.25	4.84	4.73	4.75	4.55	4.53	4.50
31/35	4.50	4.50	4.45				4.30	4.04				
						1988						
Under 15					9.00	9.15	9.05	8.92	8.75	8.68	8.76	8.60
16/20	6.76	6.95	7.06	7.18	7.26	7.34	7.26	7.02	6.98	6.95	6.97	6.80
21/25	5.54	5.88			6.85	6.65	6.33	6.11	6.00	6.01	6.20	6.30
26/30	4.51	4.54				5.33	5.09	4.97	4.91	4.93	5.11	5.14
31/35	4.00	4.00				4.13	3.99	3.94	3.83	3.87	3.03	3.95
						1989						
Under 15	8.54	8.27	8.00	7.52	6.78	6.55	6.58	6.31	5.70	5.60	5.55	5.41
16/20	6.90	6.75	6.00	6.25	5.17	5.30	5.46	5.25	4.74	4.73	4.73	4.68
21/25	6.16	6.11	5.50	5.35	4.18	4.35	4.49	4.28	3.84	3.86	3.93	3.93
26/30	5.13	5.00	4.35	4.50	4.02	4.15	4.30	4.15	3.58	3.70	3.78	3.74
31/35	4.05						3.80				3.55	3.53

1/ Mostly Bangladesh origin

TABLE 14

JAPAN - SUPPLIES AND APPARENT USAGE OF SHRIMP
1974-1989
(Thousands of Metric Tons/Product Weight)

Year	Landings	Imports	Total	Exports	Cold Storage Adjustments	Apparent Usage	Per-Capita (Kilograms)
1974	45.4	103.4	148.8	-4.0	-	144.8	1.27
1975	39.7	113.7	153.4	-3.0	-	150.4	1.32
1976	35.1	123.4	158.5	-2.0	- 5.4	151.1	1.32
1977	30.7	124.8	155.5	-1.7	1.3	155.1	1.36
1978	34.3	144.0	178.3	-2.0	- 0.1	176.2	1.50
1979	30.3	158.7	189.0	-2.1	- 4.4	182.5	1.54
1980	29.3	143.0	172.3	-1.8	- 3.4	167.1	1.45
1981	31.1	161.5	192.6	-2.8	-10.8	179.0	1.50
1982	34.0	151.3	185.3	-2.1	- 3.1	180.1	1.50
1983	36.4	148.6	185.0	-2.2	1.1	183.9	1.54
1984	35.9	169.1	205.0	-2.2	- 4.5	198.3	1.63
1985	32.9	182.9	215.8	-2.0	- 5.6	208.2	1.72
1986	28.7	212.8	241.5	-1.7	- 8.2	231.6	1.91
1987	26.5	245.9	272.4	-1.4	-19.5	251.5	2.06
1988[1/]	26.3	258.2	284.5	-0.9	-10.4	273.2	2.23
1989[1/]	27.5	263.4	290.9	-0.9	10.3	300.3	2.44

1/ Preliminary

TABLE 15

JAPAN - SHRIMP IMPORTS

1984-1989

(Thousands of Metric Tons/Product Weight)

Origin	1984	1985	1986	1987	1988	1989
Indonesia	24.0	24.4	27.7	30.8	38.7	50.0
Thailand	6.8	7.4	8.9	11.6	22.0	38.8
China (PR)	9.6	10.7	18.7	27.9	38.1	37.2
India	38.5	36.2	36.7	36.5	32.1	29.7
Philippines	5.1	6.0	8.4	11.8	18.6	18.4
Greenland	2.6	6.3	9.5	12.9	14.2	16.2
Vietnam	5.1	7.0	9.3	11.8	16.8	15.9
Taiwan	16.5	21.8	37.8	49.2	20.6	8.9
Australia	10.2	10.5	9.4	9.9	9.3	8.6
Bangladesh	5.9	7.4	7.2	6.0	6.2	4.8
Iceland	*	1.7	2.1	3.3	3.6	3.0
Canada	*	0.2	0.7	1.2	1.6	3.0
Denmark	*	2.5	1.7	2.0	2.7	2.7
Norway	*	4.3	3.1	2.5	3.8	2.3
South Korea	2.3	2.3	3.3	2.1	2.3	1.7
Mexico	2.2	2.0	1.8	1.7	2.0	1.5
Other	40.3	32.2	26.5	24.7	25.6	20.7
Total	169.1	182.9	212.8	245.9	258.2	263.4

* Included in Other.

Sources: Federal Customs Agency, Japan and LMR, Inc.

TABLE 16

JAPAN - SHRIMP IMPORTS
FROM NORTH ATLANTIC/NORTH PACIFIC COUNTRIES
1985-1989

(Thousands of Metric Tons/Product Weight)

Origin	1985	1986	1987	1988	1989
Greenland	6.3	9.5	12.9	14.2	16.2
Iceland	1.7	2.1	3.3	3.6	3.0
Canada	0.2	0.7	1.2	1.6	3.0
Denmark	2.5	1.7	2.0	2.7	2.7
Norway	4.3	3.1	2.5	3.8	2.3
South Korea	2.3	3.3	2.1	2.3	1.7
U.S.S.R.	0.5	0.4	0.6	0.5	0.9
United States	0.3	0.4	0.3	0.4	0.8
France	0.6	0.7	0.8	0.5	0.2
Total	18.7	21.9	25.7	29.6	30.8

Sources: Federal Customs Agency, Japan and LMR, Inc.

TABLE 17A

INDIA BLACK TIGER SHRIMP PRICES
TOKYO WHOLESALE, MONTHLY AVERAGES, YEN PER KILOGRAM
FROZEN, RAW HEADLESS, SHELL-ON

Size Count	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
						1987						
8/12	2,875	2,775	2,725	2,725	2,620	2,562	2,750	2,768	2,737	2,913	3,275	3,375
13/15	2,625	2,675	2,512	2,488	2,412	2,438	2,638	2,650	2,612	2,800	3,075	3,175
16/20	2,425	2,338	2,325	2,338	2,225	2,162	2,375	2,350	2,275	2,300	2,450	2,425
21/25	2,075	2,000	2,025	2,050	1,950	1,900	2,162	2,100	1,962	1,850	1,850	1,813
26/30	1,850	1,788	1,788	1,800	1,712	1,662	1,950	1,868	1,725	1,588	1,550	1,525
						1988						
8/12	3,225	2,925	2,900	3,050	3,125	3,125	3,125	*	3,325	3,325	3,088	3,000
13/15	2,975	2,750	2,750	2,738	2,663	2,625	2,575	*	2,875	2,825	2,563	2,375
16/20	2,225	2,167	2,150	2,213	2,175	2,150	2,075	*	2,375	2,425	2,088	1,975
21/25	1,725	1,675	1,650	1,788	1,725	1,700	1,650	*	1,900	1,975	1,863	1,663
26/30	1,325	1,300	1,275	1,425	1,450	1,463	1,425	*	1,675	1,725	1,513	1,450
						1989						
8/12	3,000	3,025	3,025	2,950	2,900	2,800	2,725	2,725	2,512	2,200	2,112	2,100
13/15	2,300	2,300	2,250	2,175	2,175	2,000	2,025	2,025	1,775	1,675	1,675	1,687
16/20	1,850	1,850	1,800	1,650	1,675	1,550	1,575	1,575	1,487	1,438	1,467	1,567
21/25	1,575	1,600	1,600	1,437	1,450	1,325	1,400	1,400	1,325	1,267	1,250	1,300
26/30	1,375	1,400	1,425	1,350	1,367	1,225	1,275	1,275	1,225	1,175	1,167	1,187

*No data

Source: FAO

TABLE 17B

INDIA BLACK TIGER SHRIMP PRICES
TOKYO WHOLESALE, MONTHLY AVERAGES, U.S. DOLLARS PER POUND
FROZEN, RAW HEADLESS, SHELL-ON

Size Count	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
						1987						
8/12	8.38	8.19	8.10	8.60	8.57	8.09	7.86	8.62	8.76	9.13	10.95	11.80
13/15	7.65	7.90	7.46	7.85	7.89	7.70	7.54	8.25	8.36	8.78	10.28	11.10
16/20	7.07	6.90	6.91	7.38	7.28	6.82	6.79	7.32	7.28	7.21	8.19	8.48
21/25	6.05	5.90	6.02	6.47	6.38	6.00	6.18	6.54	6.28	5.80	6.18	6.34
26/30	5.39	5.28	5.31	5.68	5.89	5.25	5.57	5.81	5.52	4.98	5.18	5.33
						1988						
8/12	11.54	10.31	10.30	11.09	11.36	11.36	10.68	*	11.29	11.28	11.05	11.27
13/15	10.65	9.69	9.77	9.96	9.68	9.55	8.80	*	9.75	9.58	9.17	8.92
16/20	7.96	7.64	7.63	8.05	7.91	7.82	7.09	*	8.06	8.23	7.47	7.42
21/25	6.17	5.90	5.86	6.50	6.27	6.18	5.64	*	6.45	6.70	6.67	6.25
26/30	4.74	4.58	4.53	5.18	5.27	5.32	4.87	*	5.68	5.85	5.42	5.45
						1989						
8/12	10.91	10.58	10.66	10.16	9.84	8.78	8.85	8.66	7.77	7.04	6.67	6.63
13/15	8.36	8.04	7.93	7.49	7.38	6.27	6.57	6.44	5.49	5.36	5.29	5.33
16/20	6.73	6.47	6.34	5.68	5.68	4.86	5.11	5.01	4.60	4.60	4.63	4.95
21/25	5.73	5.59	5.64	4.95	4.92	4.15	4.55	4.45	4.10	4.06	3.95	4.10
26/30	5.00	4.90	5.02	4.65	4.64	3.84	4.14	4.05	3.79	3.76	3.68	3.75

*No data
Converted to U.S. dollars at current monthly yen exchange rates.

TABLE 18

WESTERN EUROPE DOMESTIC SHRIMP LANDINGS
1983-1988
(Thousands of Metric Tons/Live Weight)

Country	1983	1984	1985	1986	1987	1988[1/]
Norway	78.2	84.0	91.2	57.4	42.0	40.5
Iceland	13.1	24.4	24.9	35.8	38.6	30.3
Spain	8.9	9.6	22.3	19.4	19.1	20.0
Germany FR	13.4	12.0	17.7	17.1	17.0	16.0
Denmark	12.1	8.1	10.3	11.2	16.1	10.9
Faeroe Islands	7.4	9.3	11.6	10.0	10.1	9.0
France	2.4	2.9	2.0	2.6	1.6	2.0
Sweden	1.1	1.1	1.6	1.5	1.3	1.2
Belgium	1.0	1.0	0.9	0.6	0.8	0.8
Italy	0.2	0.3	0.3	0.3	0.3	0.3
Netherlands	7.0	-	-	-	-	-
Others	5.2	5.3	5.2	4.1	5.1	4.7
Total[1/]	150.0	158.0	188.0	160.0	152.0	135.7
Total EEC[2/]	36.1	24.3	31.2	51.2	54.9	54.1

1/ Preliminary, with estimates, latest data available.
2/ EEC - European Economic Community only, excludes Spain 1983-1985.

Sources: United Nations and LMR, Inc.

TABLE 19

WESTERN EUROPE (EEC)
SHRIMP IMPORTS BY COUNTRY
1983-1988
(Thousands of Metric Tons/Product Weight)

Country	1983	1984	1985	1986	1987	1988[1/]
Denmark	31.3	38.8	48.9	54.3	58.9	55.0
United Kingdom	32.4	33.8	37.3	41.0	40.9	47.2
France	36.3	31.3	35.9	35.7	38.2	43.1
Spain	14.6[2/]	13.1[2/]	8.2[2/]	18.4	24.5	25.0
Italy	12.6	14.2	18.5	20.9	20.2	20.0
Netherlands	12.2	9.8	13.1	12.7	15.8	15.0
Germany FR	11.7	10.7	11.7	12.3	14.3	13.4
Belgium	10.5	8.0	9.6	12.0	14.2	13.0
Portugal	1.0[2/]	0.5[2/]	0.8[2/]	1.4	2.4	2.5
Ireland	0.4	0.5	0.7	0.7	0.8	0.7
Greece	0.1	0.1	0.0	0.0	0.1	0.1
Total EEC[3/]	163.1	160.8	184.7	209.4	230.3	235.0
Ex-EEC[4/]	104.1	113.2	122.0	151.8	164.7	170.0

1/ Preliminary, with estimates.
2/ Not in EEC.
3/ Includes reexports.
4/ From outside EEC countries.

Sources: EUROSTAT: NIMIXE, European Supplies Bulletins

TABLE 20

WESTERN EUROPE (EEC)
SUPPLIES AND APPARENT USAGE OF SHRIMP
1983-1988
(Thousands of Metric Tons/Product Weight)

	1983	1984	1985	1986
Landings	36.1	24.3	31.2	51.2
Imports[1/]	104.1	113.2	122.0	151.8
Exports[2/]	-20.3	-24.4	-26.4	-30.2
Usage	119.9	113.1	126.8	172.8

	1987	1988[3/]
Landings	54.9	54.1
Imports[1/]	164.7	170.0
Exports[2/]	-34.0	-35.0
Usage	185.6	189.1

1/ From countries outside EEC.
2/ To countries outside EEC.
3/ Preliminary, with estimates.

Sources: Various European statistical reports and LMR, Inc.

TABLE 21

WORLD SHRIMP PRODUCTION, POPULATION GROWTH AND PER-CAPITA SUPPLIES 1980-2000

Year	World Shrimp Production (Metric Tons x 1,000)	World Population (x 1,000,000)	Per-Capita Supplies (in Kilograms)
1980	1,657	4,478	0.370
1981	1,629	4,577	0.356
1982	1,705	4,640	0.367
1983	1,744	4,722	0.369
1984	1,865	4,766	0.391
1985	1,981	4,865	0.407
1986	2,002	4,942	0.405
1987	2,048	5,016	0.408
1988	2,100	5,106	0.411
1989[1/]	2,170	5,188	0.418
1990	2,240	5,271	0.425
1991	2,280	5,355	0.426
1992	2,320	5,441	0.426
1993	2,360	5,528	0.427
1994	2,390	5,616	0.426
1995	2,440	5,706	0.428
1996	2,480	5,797	0.428
1997	2,530	5,890	0.429
1998	2,600	5,984	0.434
1999	2,645	6,080	0.435
2000	2,700	6,177	0.437

1/ Projections to 2000.

TABLE 22

ESTIMATED WORLD SHRIMP PRODUCTION
FOR PRINCIPAL PRODUCING NATIONS
1986-2000
(Thousands of Metric Tons/Live Weight)

Nation	1986	1987	1988[1/]	1989[2/]	1990
China (PR)	220	232	260	290	320
India	215	217	210	205	220
United States	183	165	150	159	150
Indonesia	157	168	180	200	210
Thailand	139	150	170	190	200
Taiwan	138	158	120	90	90
Mexico	73	84	80	85	90
Malaysia	73	70	75	80	85
Philippines	72	68	80	90	100
Brazil	69	64	70	75	80
Vietnam	55	56	65	70	75
Ecuador	53	79	80	75	80
Japan	48	47	50	50	50
Pakistan	27	30	30	32	35
Australia	20	22	25	28	30
Other	460	438	455	451	425
Total	2,002	2,048	2,100	2,170	2,240
Farm-Raised[3/]	270	340	410	490	580
Ocean-Caught[3/]	1,732	1,708	1,690	1,680	1,660
Total	2,002	2,048	2,100	2,170	2,240
Heads-off Weight (60%)[3/]	1,201	1,229	1,260	1,302	1,344

1/ Preliminary
2/ Estimated 1989 to 2000
3/ Estimated

TABLE 22
(Continued)

ESTIMATED WORLD SHRIMP PRODUCTION
FOR PRINCIPAL PRODUCING NATIONS
1986-2000
(Thousands of Metric Tons/Live Weight)

Nation	1991	1992	1993	1994	1995
China (PR)	360	370	370	380	380
India	225	230	235	240	250
United States	160	170	160	150	150
Indonesia	215	220	225	230	235
Thailand	205	210	215	220	220
Taiwan	95	100	95	100	100
Mexico	90	95	100	100	110
Malaysia	90	95	100	100	110
Philippines	100	110	110	115	115
Brazil	85	90	95	100	100
Vietnam	80	80	85	85	90
Ecuador	80	80	80	80	85
Japan	50	50	50	50	50
Pakistan	36	40	40	40	35
Australia	30	32	34	36	40
Other	379	348	366	364	370
Total	2,280	2,320	2,360	2,390	2,440
Farm-Raised	650	750	810	860	900
Ocean-Caught	1,630	1,570	1,550	1,530	1,540
Total	2,280	2,320	2,360	2,390	2,440
Heads-off Weight[1/]	1,368	1,392	1,416	1,434	1,464

1/ 60 Percent

TABLE 22
(Continued)

ESTIMATED WORLD SHRIMP PRODUCTION
FOR PRINCIPAL PRODUCING NATIONS
1986-2000
(Thousands of Metric Tons/Live Weight)

Nation	1996	1997	1998	1999	2000
China (PR)	390	400	410	420	430
India	270	270	280	270	280
United States	140	130	140	130	130
Indonesia	240	250	260	270	280
Thailand	225	230	235	240	240
Taiwan	95	100	95	100	100
Mexico	110	115	115	120	120
Malaysia	115	120	125	130	130
Philippines	120	125	130	140	145
Brazil	105	110	110	115	115
Vietnam	90	95	95	100	100
Ecuador	90	85	90	85	90
Japan	50	50	50	50	50
Pakistan	40	35	40	40	40
Australia	40	40	42	40	45
Other	360	375	383	395	405
Total	2,480	2,530	2,600	2,645	2,700
Farm-Raised	920	980	1,030	1,085	1,150
Ocean-Caught	1,560	1,550	1,570	1,560	1,550
Total	2,480	2,530	2,600	2,645	2,700
Heads-off Weight[1/]	1,488	1,518	1,560	1,587	1,620

1/ 60 Percent

TABLE 23

WORLD SHRIMP USAGE

1980-2000

(Thousands of Metric Tons/Product Weight)

Year	Total	United States	Japan	Western Europe	Other
1980	994.0	180.0	167.1	102.0	544.9
1981	977.0	186.4	179.0	110.0	501.6
1982	1,023.0	190.4	180.1	115.0	537.5
1983	1,046.0	203.3	183.9	119.9	538.9
1984	1,119.0	232.5	198.3	113.1	575.1
1985	1,189.0	245.4	208.2	126.8	608.6
1986	1,201.0	280.1	231.6	172.8	516.5
1987	1,229.0	300.1	251.5	185.6	491.8
1988	1,260.0	308.6	273.2	189.1	489.1
1989[1/]	1,302.0	314.7	300.3	194.0	493.0
1990[2/]	1,344.0	358.4	294.7	202.0	488.9
1991	1,368.0	375.9	305.2	210.0	476.9
1992	1,392.0	403.8	315.7	218.0	454.5
1993	1,416.0	419.4	326.2	226.0	444.4
1994	1,434.0	435.2	336.7	235.0	427.1
1995	1,464.0	458.2	347.2	244.0	414.6
1996	1,488.0	474.5	357.7	254.0	401.8
1997	1,518.0	491.0	368.3	263.0	395.7
1998	1,560.0	507.9	378.9	274.0	399.2
1999	1,587.0	525.0	389.6	285.0	387.4
2000	1,620.0	540.0	400.0	296.0	384.0

1/ Preliminary with estimates.

2/ Projections to 2000.

TABLE 24

CANADA - SHRIMP LANDINGS, PRODUCTION AND EXPORTS
1979-1989
(Metric Tons)

	1978	1979	1980	1981	1982	1983
LANDINGS[1/]						
Atlantic Coast	10.1	13.0	13.3	16.3	12.8	14.1
Pacific Coast	1.6	0.7	0.7	0.9	0.7	0.7
Total	11.7	13.7	14.0	17.2	13.5	14.8
PRODUCTS[2/]						
In Shell	0.4	1.8	4.2	7.9	4.9	3.3
Peeled	2.6	2.6	1.8	2.0	2.2	3.0
EXPORTS[2/]	2.1	3.9	5.3	4.8	4.6	3.5

	1984	1985	1986	1987	1988[3/]	1989[3/]
LANDINGS[1/]						
Atlantic Coast	11.8	13.5	17.9	25.5	29.0	31.0
Pacific Coast	0.9	1.2	1.3	3.3	2.7	2.2
Total	12.5	14.7	19.2	28.8	31.7	33.2
PRODUCTS[2/]						
In Shell	2.7	3.3	4.7	7.3	8.0	
Peeled	2.7	4.1	3.7	4.1	4.3	
EXPORTS[2/]	3.0	2.7	4.5	6.4	13.3	

1/ Live Weight
2/ Product Weight
3/ Preliminary

Source: Canadian Fisheries - Annual Statistical Review

TABLE 25

EUROPEAN ECONOMIC COMMUNITY (EEC)
IMPORTS OF SHRIMP (PANDALIDS) PRODUCTS, 1988
(Metric Tons - Product Weight)

Origin	Total	Denmark	Spain	France	Italy	United Kingdom	Others[1/]
France	228	3	43	-	38	18	126
Belgium/Luxembourg	390	-	48	149	29	26	138
Netherlands	971	197	-	281	112	104	277
United Kingdom	989	28	354	125	264	-	218
Iceland	245	-	-	3	25	209	8
Denmark	16,011	-	191	10,112	1,452	3,260	996
Iceland	2,179	1,022	10	151	-	865	131
Faroe Islands	10,370	9,774	-	24	-	21	551
Norway	99	50	-	4	2	33	10
USSR	146	-	-	-	-	-	146
Canada	5,107	4,183	-	226	-	331	367
Greenland	26,403	26,296	18	38	-	14	37
United States	264	-	14	-	16	222	12
Others	11,646	70	6,111	178	3,815	632	840
Total	75,048	41,623	6,789	11,291	5,753	5,735	3,857

1/ Others - Belgium/Luxembourg, West Germany, Greece, Portugal, Ireland, Netherlands

Source: External Trade, NIMEXE Annuals

TABLE 26

ECUADOR WHITE SHRIMP PRICES
NEW YORK WHOLESALE MONTHLY AVERAGES, U.S. DOLLARS PER POUND
FROZEN, RAW HEADLESS, SHELL-ON

Size Count/ Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Under 15												
1981	5.65	5.85	6.02	6.24	6.35	6.35	6.40	6.35	6.58	6.90	7.07	7.15
1982	7.24	7.40	7.16	6.83	6.75	6.67	6.74	7.03	7.30	7.31	7.40	7.65
1983	7.66	7.68	7.56	7.41	7.53	7.62	7.52	7.50	7.45	7.44	7.68	7.88
1984	7.91	7.94	8.19	8.45	8.54	8.66	8.73	8.77	8.70	8.73	8.74	8.61
1985	8.41	8.11	7.90	7.60	7.55	7.60	7.61	7.72	7.76	7.65	7.16	7.15
1986	7.10	7.06	7.09	7.08	7.38	7.50	7.50	7.63	7.73	7.68	7.89	8.00
1987	8.05	8.21	8.40	8.75	9.45	9.65	9.66	9.65	9.65	9.80	9.50	9.15
1988	9.18	9.35	9.35	9.29	9.25	9.25	9.25	9.40	9.50	9.50	9.58	9.56
1989	9.50	9.43	9.30	9.26	9.24	9.34	9.40	9.34	9.21	8.81	8.55	7.98
1990	7.34											
26/30												
1981	4.35	4.55	4.77	4.80	4.80	4.75	4.49	3.97	4.18	4.30	4.40	4.47
1982	4.74	5.46	5.82	5.96	6.19	6.11	5.90	6.24	6.62	6.51	6.55	6.70
1983	6.51	6.28	6.02	5.75	5.90	6.15	5.89	5.78	5.71	5.62	5.55	5.45
1984	5.35	5.39	5.59	5.50	5.32	5.30	5.27	5.16	5.10	5.24	5.30	5.24
1985	5.11	4.90	4.70	4.53	4.50	4.54	4.63	4.80	5.04	5.02	4.92	5.08
1986	5.26	5.73	5.83	5.82	6.23	6.43	6.15	6.21	6.05	5.58	5.70	5.69
1987	5.64	5.44	5.29	5.41	5.58	5.31	5.15	5.05	5.08	5.11	5.03	5.13
1988	5.26	5.61	6.02	6.25	6.17	6.01	5.98	5.70	5.45	5.68	5.92	5.98
1989	5.71	5.54	5.39	5.18	5.08	5.00	5.00	4.75	4.55	4.51	4.89	4.94
1990	4.80											

GULF BROWN SHRIMP PRICES

26/30												
1981	4.40	4.64	4.77	4.82	4.90	4.74	4.12	3.59	3.86	4.10	4.49	4.48
1982	4.78	5.41	5.97	6.16	6.33	6.15	5.79	6.25	6.59	6.42	6.66	6.72
1983	6.64	6.46	6.22	6.08	6.12	6.25	5.95	5.78	5.70	5.59	5.52	5.45
1984	5.42	5.53	5.68	5.66	5.40	5.30	5.19	4.90	4.75	5.08	5.02	4.88
1985	5.02	5.06	4.85	4.63	4.62	4.63	4.61	4.61	4.65	4.70	4.78	4.98
1986	5.11	5.40	5.63	5.88	6.35	6.41	6.21	6.05	5.82	5.55	5.82	5.86
1987	5.85	5.60	5.34	5.35	5.47	5.23	5.00	4.87	4.85	4.78	4.79	4.98
1988	5.19	5.38	5.82	6.12	6.25	6.07	5.68	5.35	5.28	5.39	5.60	5.76
1989	5.75	5.76	5.79	5.77	5.28	5.01	4.93	4.68	4.45	4.43	4.48	4.31
1990	4.43											

Source: U.S. Department of Commerce

TABLE 27

AUSTRALIAN SPINY LOBSTER PRICES
NEW YORK WHOLESALE MONTHLY AVERAGES, U.S. DOLLARS PER POUND
FROZEN, 6-8 OUNCE TAILS

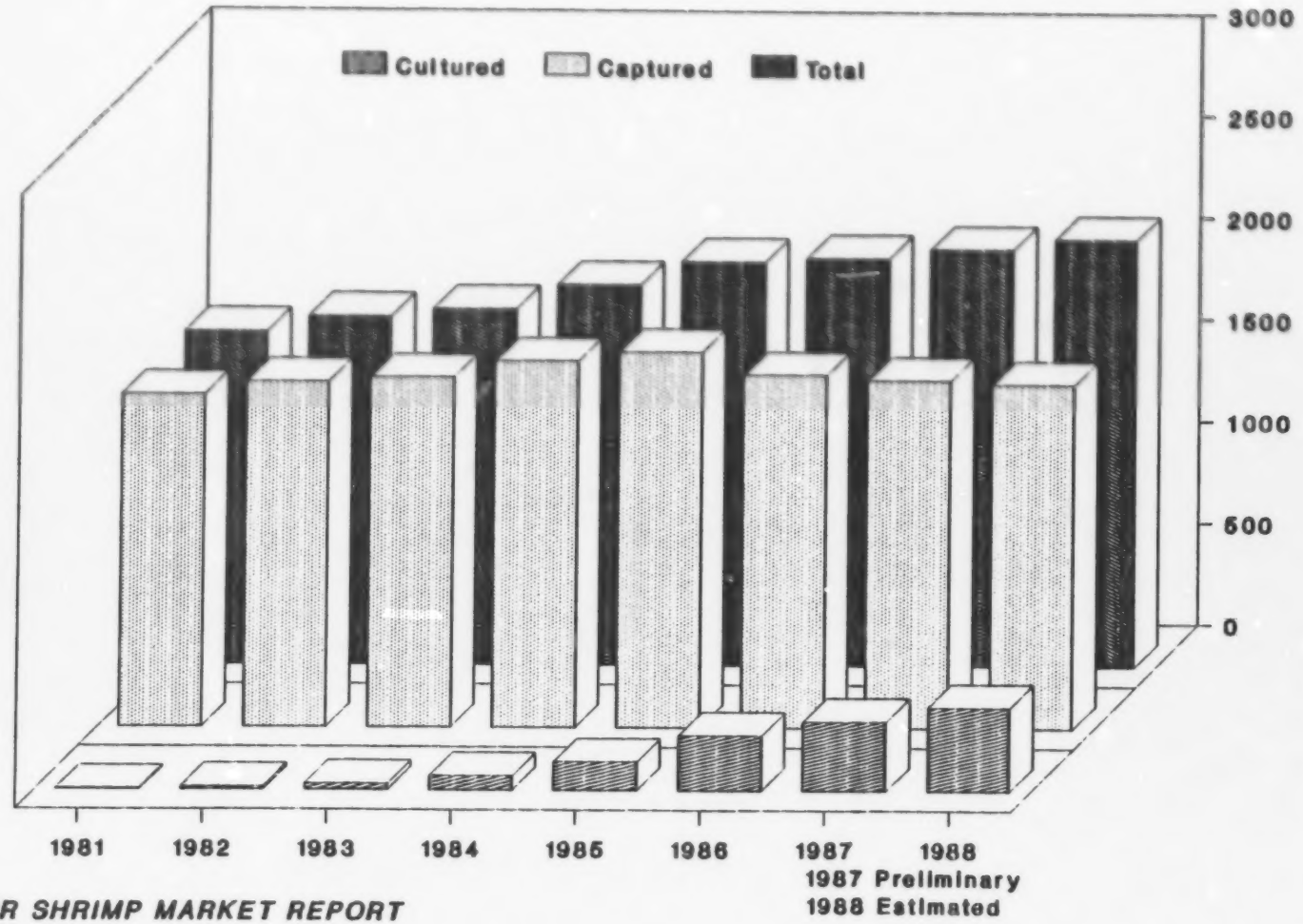
Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1981	9.25	9.20	9.40	9.78	10.75	11.08	11.14	11.11	11.40	11.75	11.79	-
1982	10.76	10.28	10.23	10.27	10.28	10.26	10.14	10.09	10.06	9.96	9.92	9.61
1983	9.10	8.83	8.83	8.96	9.12	9.56	10.00	10.19	-	-	11.82	11.36
1984	10.68	10.25	11.00	12.00	12.40	12.89	-	-	-	-	13.92	13.77
1985	13.67	13.66	14.69	14.75	14.48	13.77	13.23	13.25	13.06	12.38	11.50	10.16
1986	10.50	11.00	11.25	11.25	11.33	12.26	12.50	13.65	13.92	-	14.75	14.95
1987	15.02	15.34	15.75	16.22	16.67	17.00	17.10	17.04	18.25	18.31	18.00	-
1988	-	15.56	15.22	15.42	15.47	15.16	14.49	14.08	13.65	12.87	13.10	13.33
1989	13.30	13.48	14.24	16.14	17.48	18.60	18.79	18.81	19.00	19.50	18.80	17.44
1990	16.90	16.90										

Source: U.S. Department of Commerce

FIGURES

FIGURE 1

WORLD SHRIMP PRODUCTION, 1981-1988
(Thousands of Metric Tons-Live Weight)



LMR SHRIMP MARKET REPORT

FIGURE 2

NORTH ATLANTIC SHRIMP CATCHES
(Metric Tons - Live Weight)

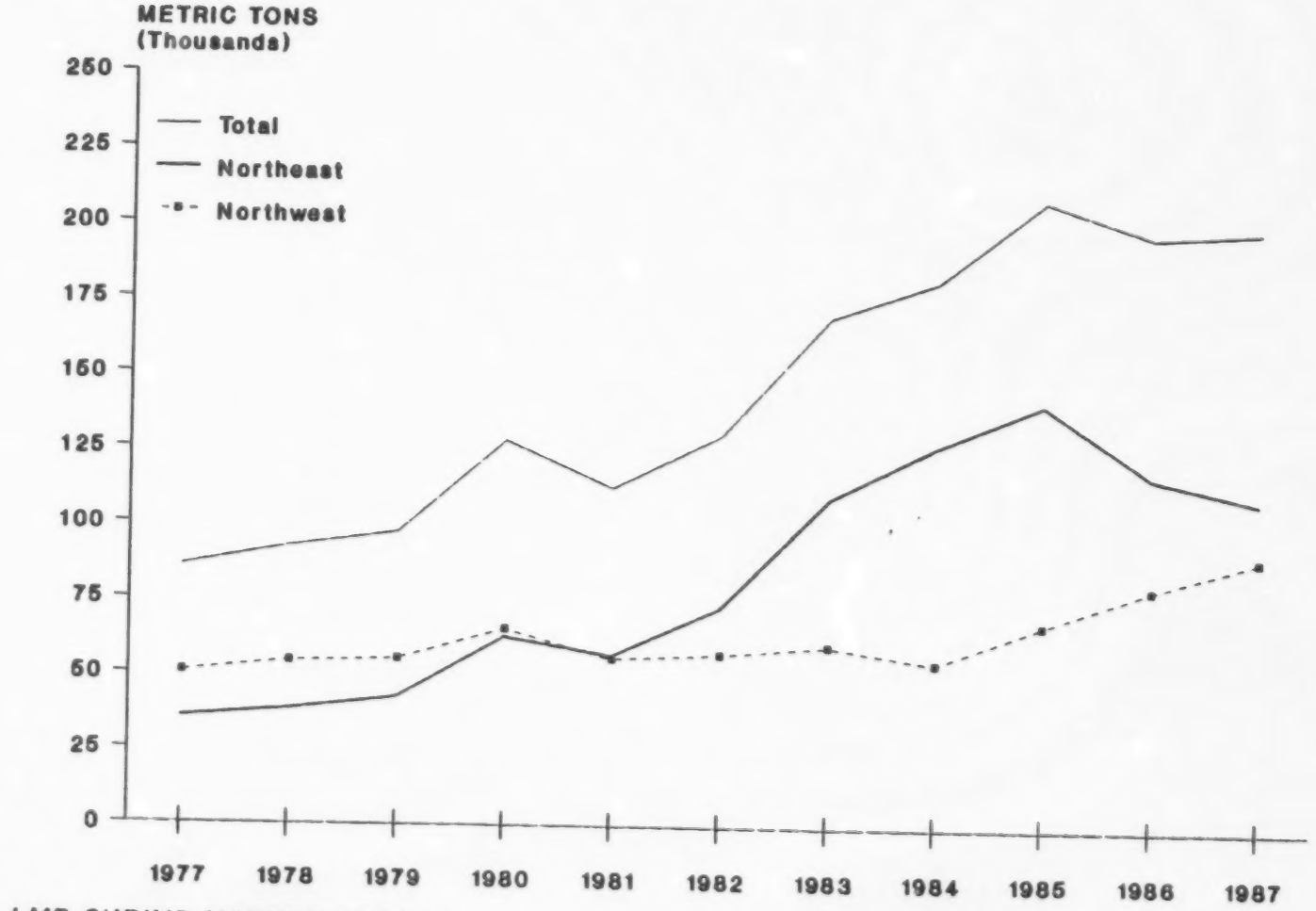


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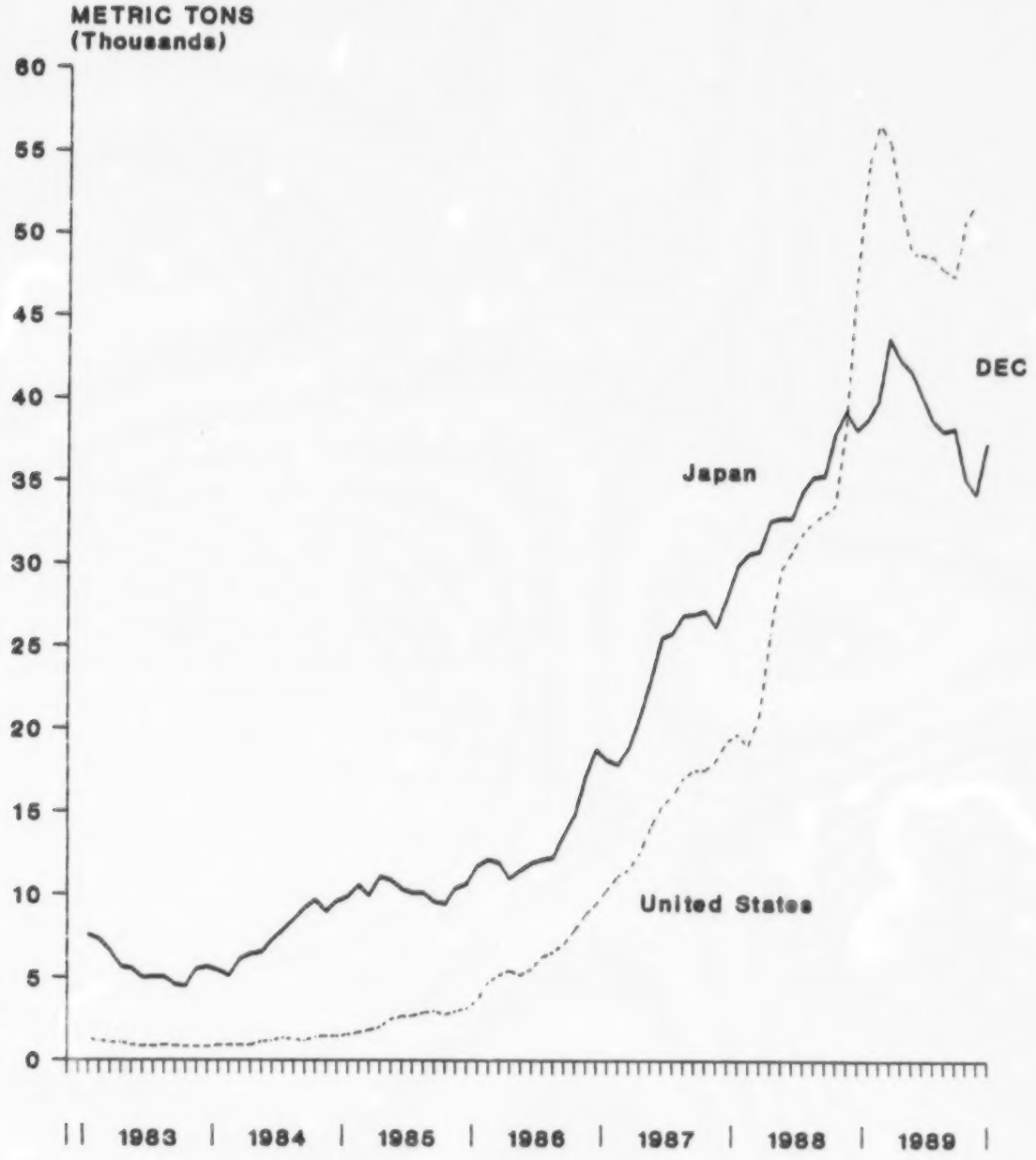
FIGURE 3

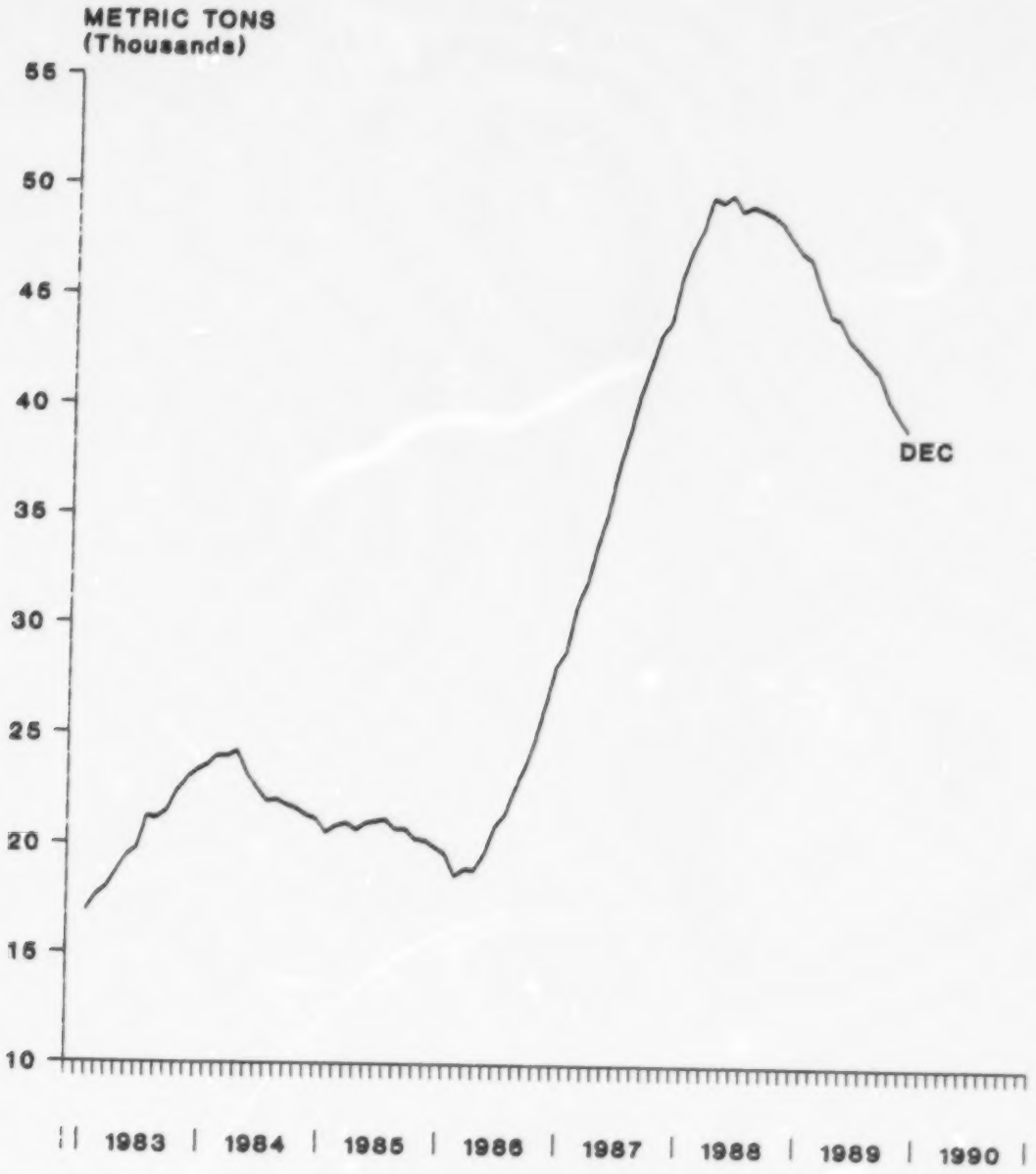
SHRIMP IMPORTS FROM CHINA
12-Month Moving Totals/Product Weight



LMR SHRIMP MARKET REPORT

FIGURE 4

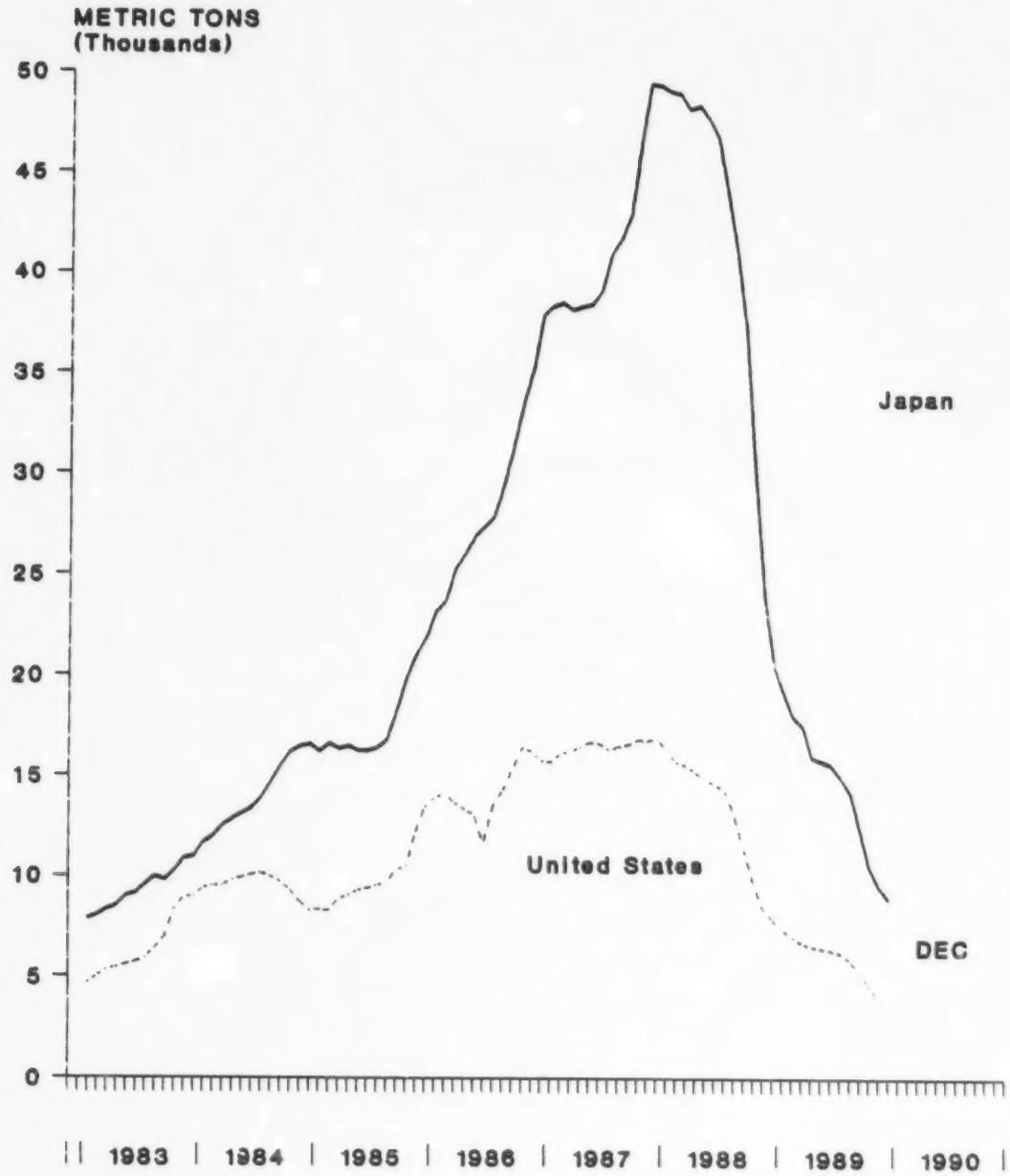
UNITED STATES SHRIMP IMPORTS FROM ECUADOR 12-MONTH MOVING TOTALS/PRODUCT WEIGHT



LMR SHRIMP MARKET REPORT

FIGURE 5

SHRIMP IMPORTS FROM TAIWAN
12-Month Moving Totals/Product Weight



LMR SHRIMP MARKET REPORT

FIGURE 6

UNITED STATES COLD STORAGE HOLDINGS
BY MONTH
Month-end Totals/Product Weight

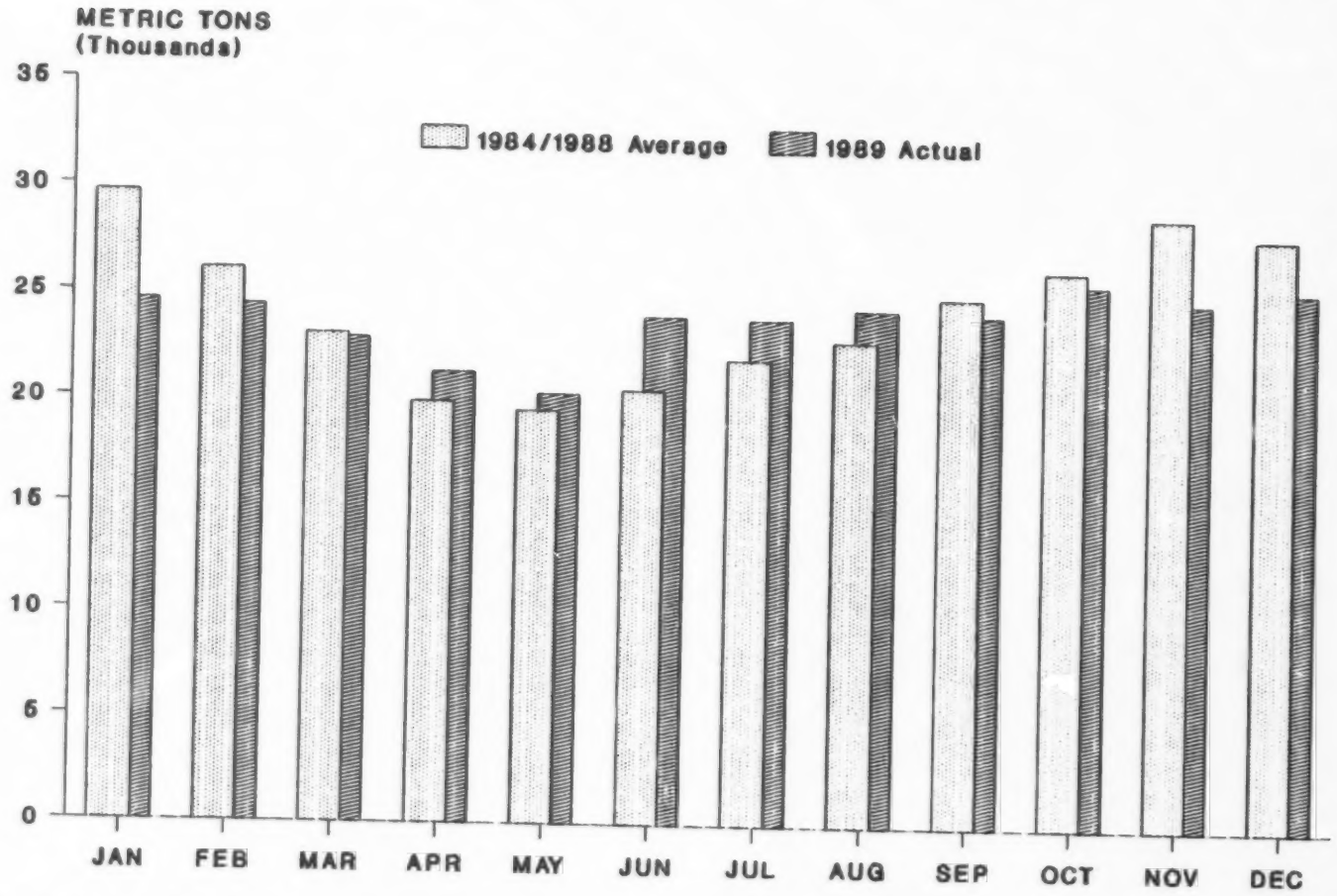


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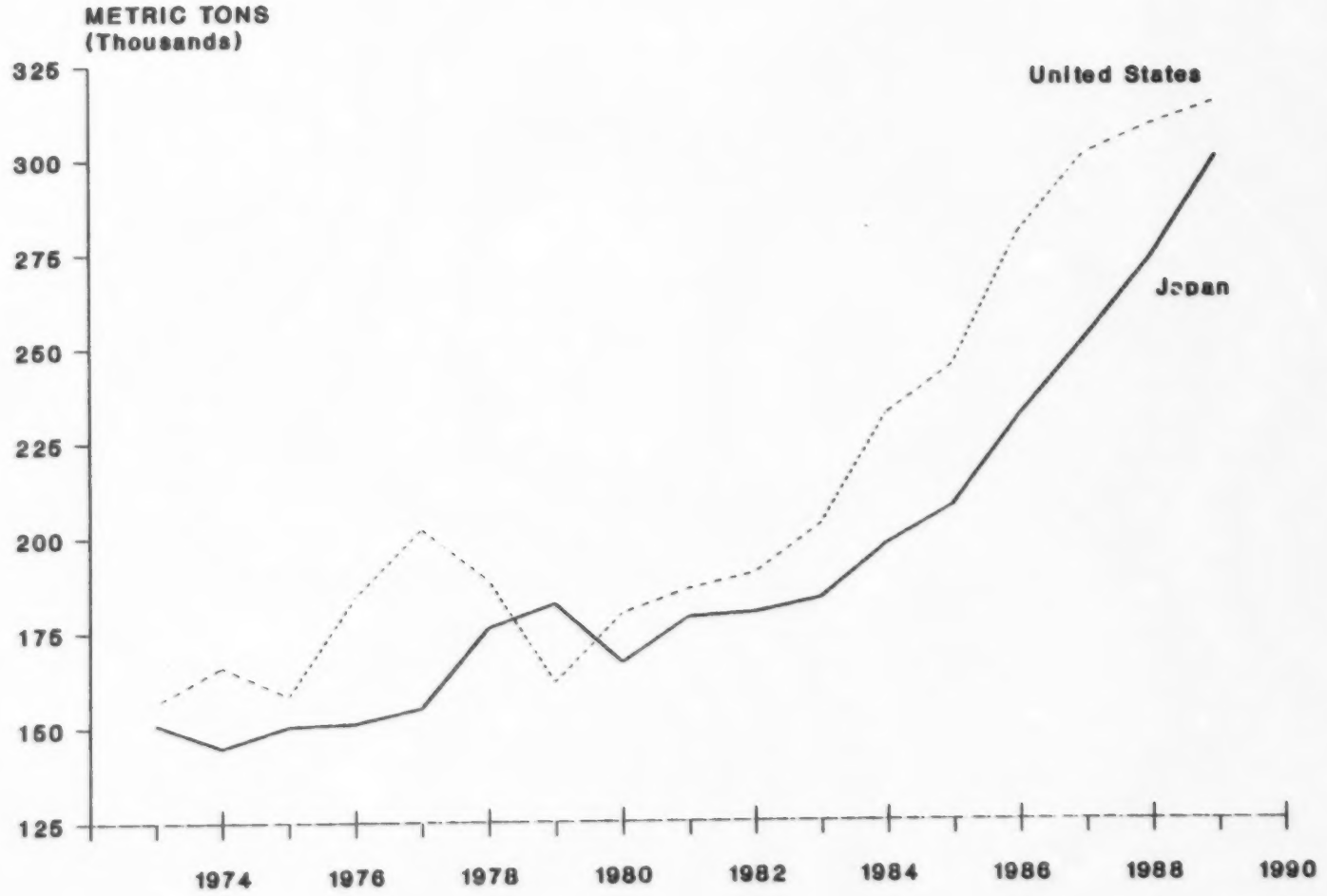
FIGURE 7

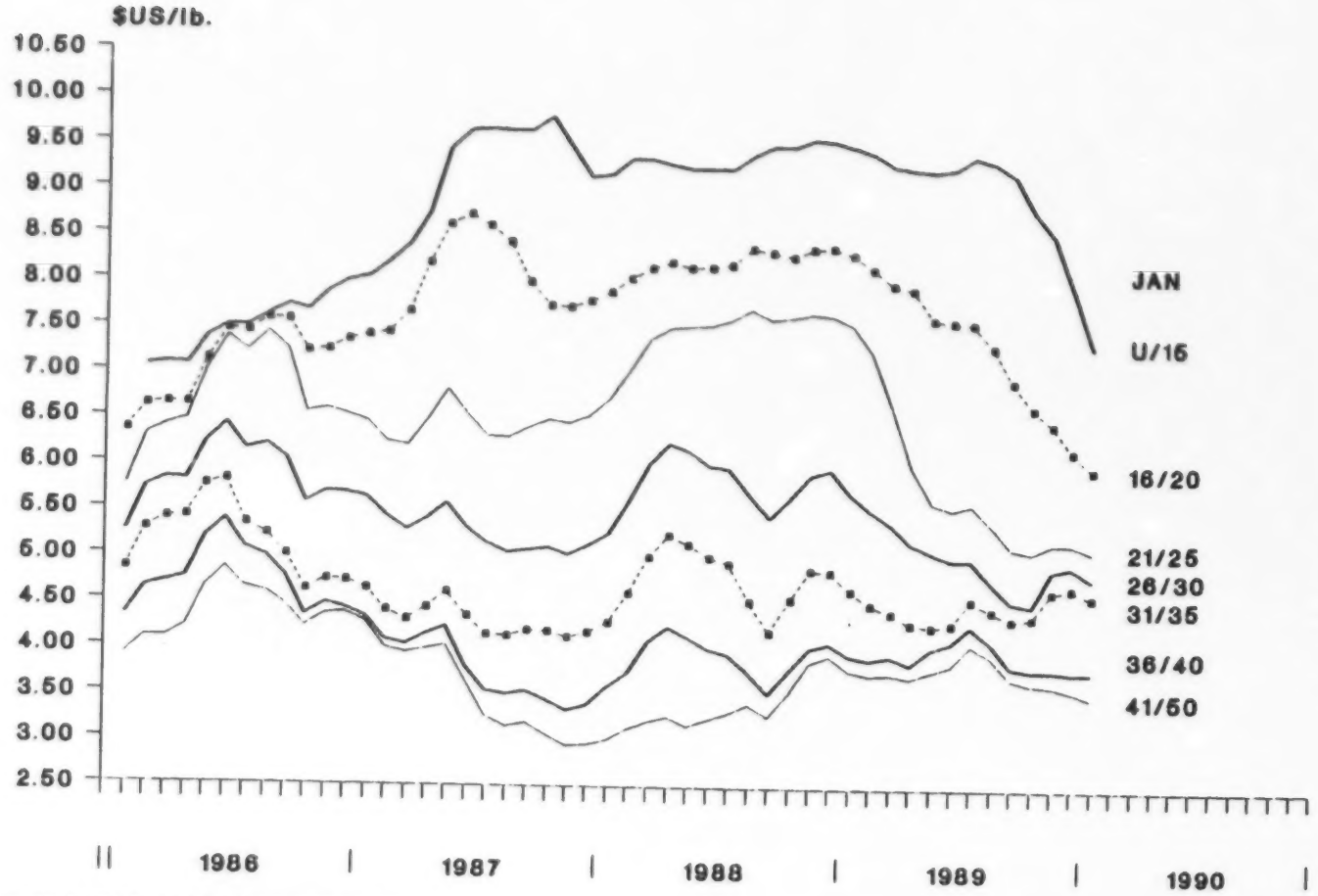
SHRIMP USAGE - UNITED STATES AND JAPAN
Product Weight



LMR SHRIMP MARKET REPORT

FIGURE 8

ECUADOR WHITE SHRIMP PRICES
New York Wholesale, Monthly Averages
Frozen, Raw Headless shell-on

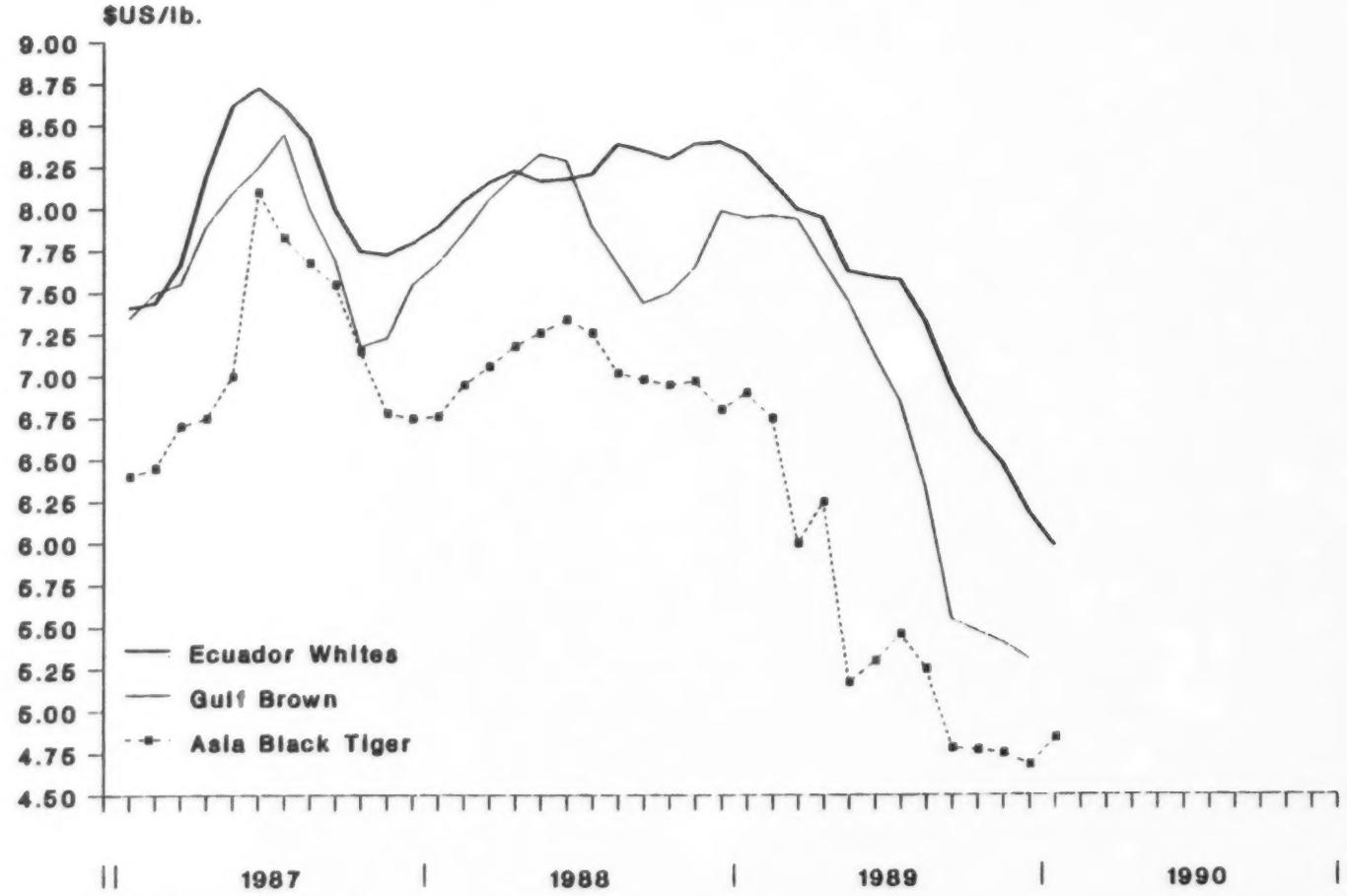


LMR SHRIMP MARKET REPORT

FIGURE 9

NEW YORK WHOLESALE SHRIMP PRICES

16/20 Count, Monthly Averages, Frozen
Raw Headless Shell-on



LMR SHRIMP MARKET REPORT

FIGURE 10

JAPAN-SHRIMP PRICES AND HOLDINGS
(Prices-Indian White, 26/30 Count Wholesale, Shell-on Headless)

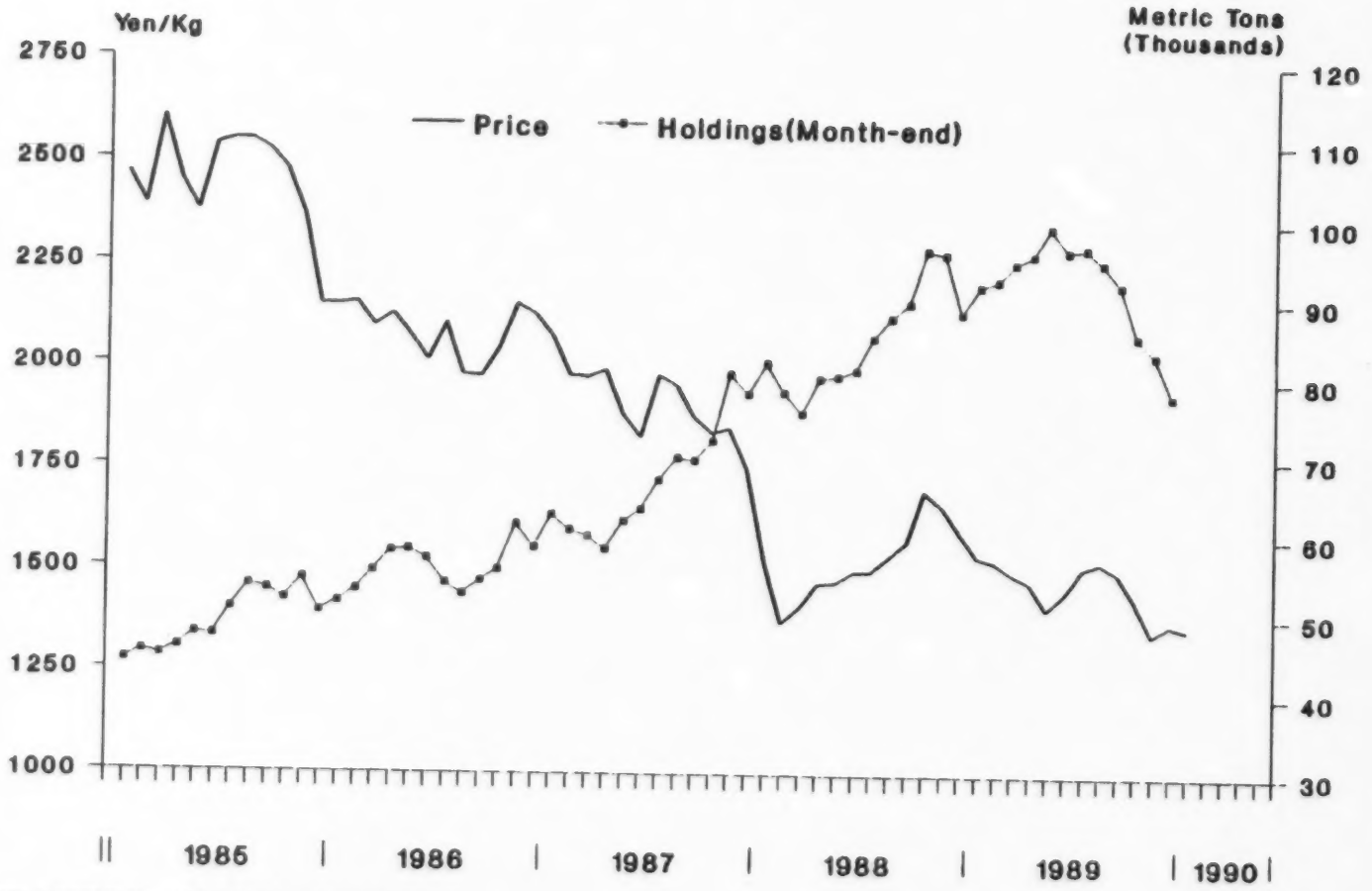


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FIGURE 11

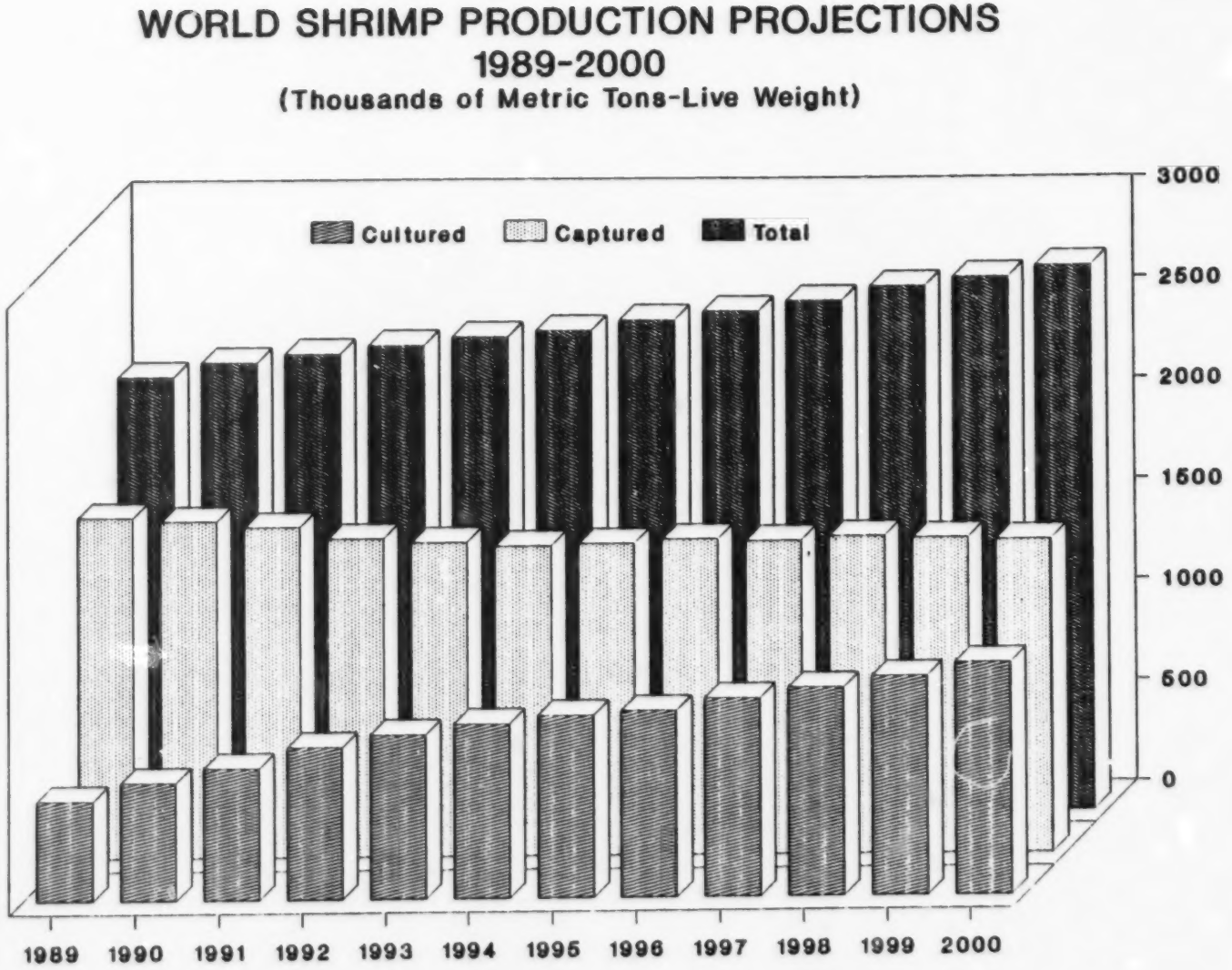
WORLD SHRIMP PRODUCTION PROJECTIONS
1989-2000
(Thousands of Metric Tons-Live Weight)
Cultured
Captured
Total
3000
2500
2000
1500
1000
500
0
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
LMR SHRIMP MARKET REPORT

FIGURE 12

NEW YORK WHOLESALE SHRIMP PRICES
Frozen, Headless, Cooked Product
By Origin, Color and Count Size

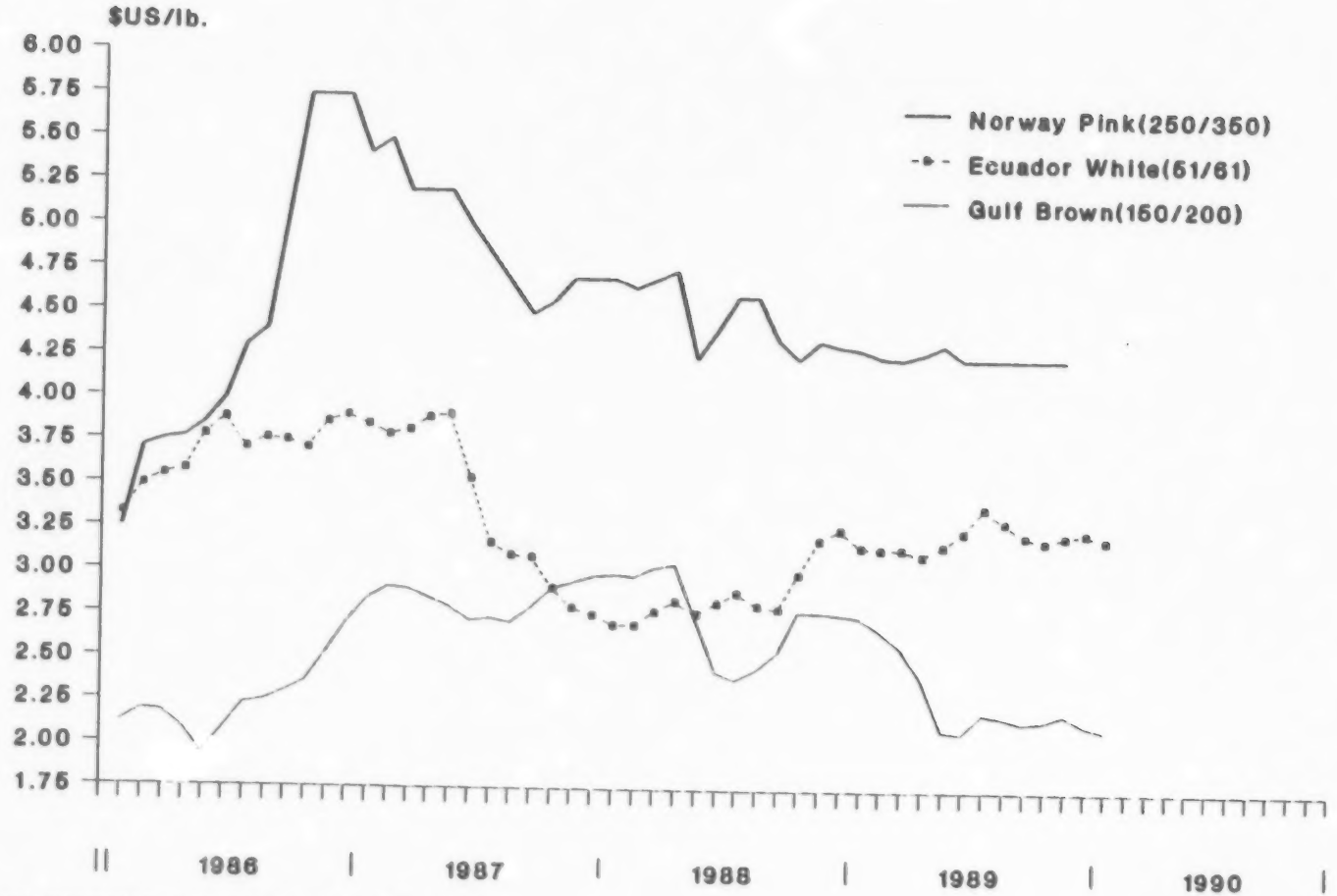

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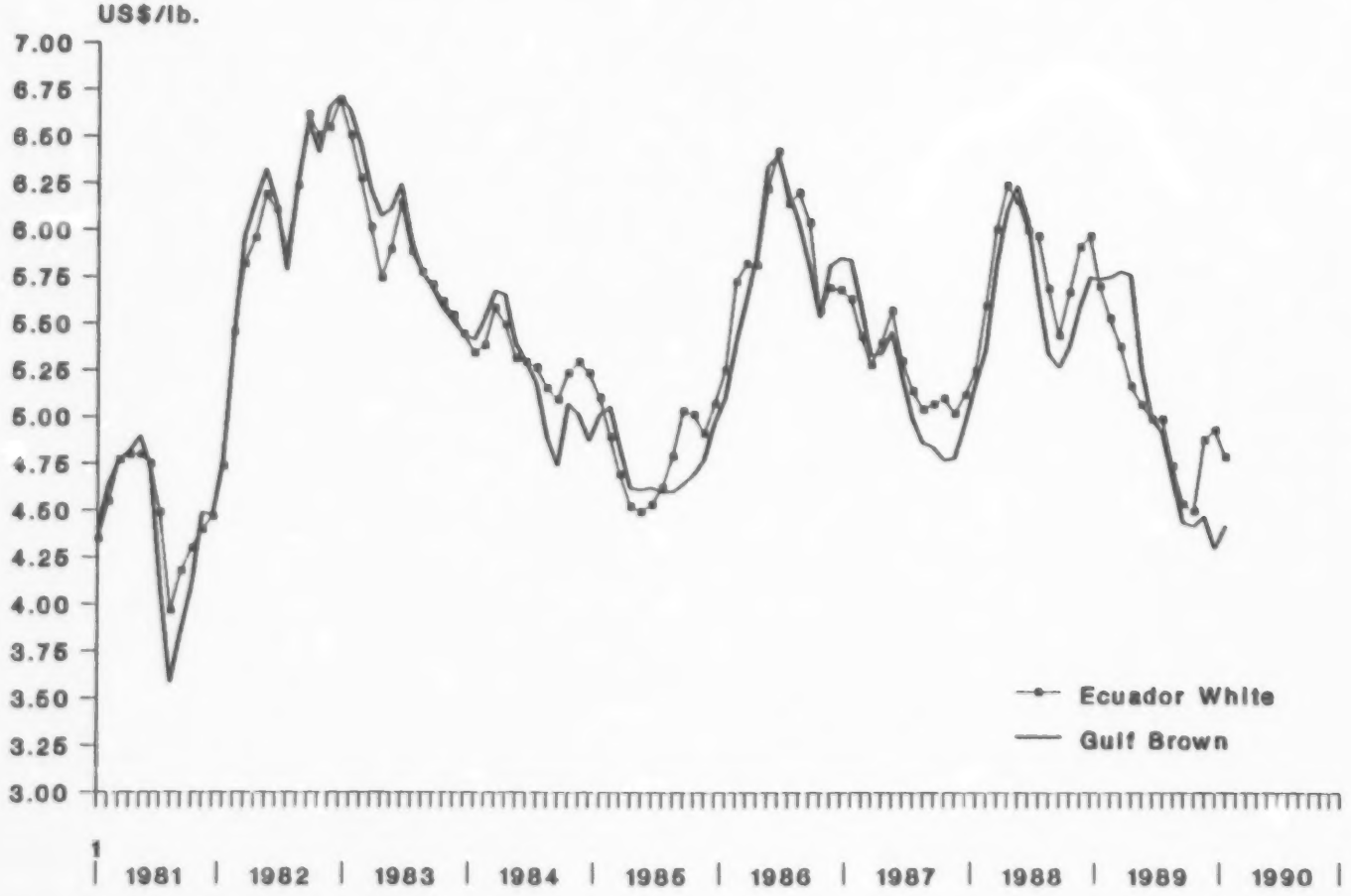
FIGURE 13

NEW YORK WHOLESALE SHELLFISH PRICES

Monthly Averages, Frozen, Shell-on
Headless, 26/30 Count Size

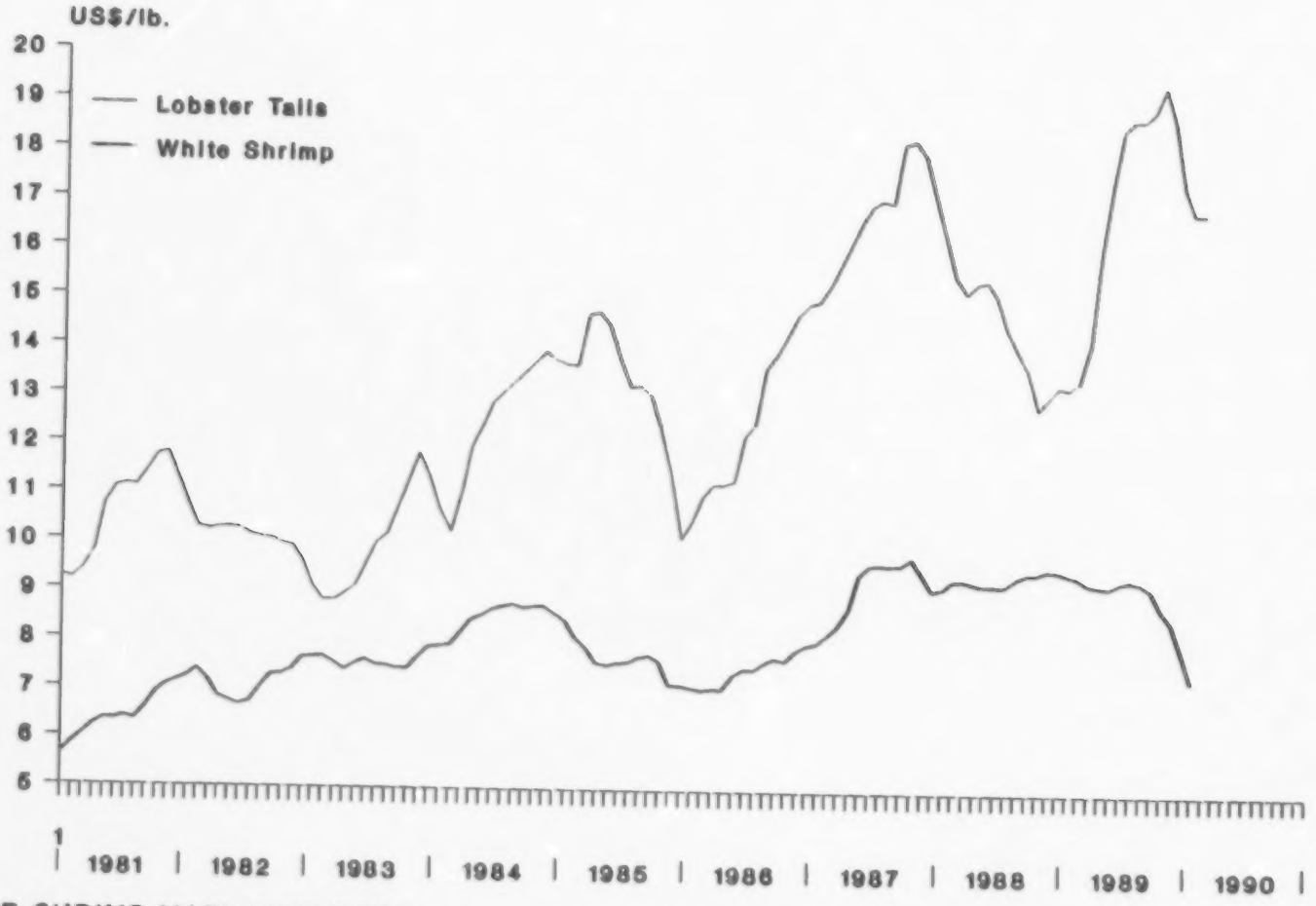


LMR SHRIMP MARKET REPORT

FIGURE 14

NEW YORK WHOLESALE SHELLFISH PRICES

Monthly Averages, Australian Spiny 6-7oz
Ecuadorian White U/15 Count



LMR SHRIMP MARKET REPORT

APPENDIX

Pandalus borealis

Family: *Pandalidae*

F.A.O. Names:
English: Northern shrimp
French: Crevette nordique
Spanish: Camarón norteño

Common and Commercial Names:
Canada: Deep-sea prawn; Great Northern prawn; Crevette nordique; Pink shrimp

Denmark: Dybhavsreje

Finland: Pohjankatkarapu

France: Crevette nordique

Germany: Grönland-Garnele; Nordmeergarnele

Greenland: Kingugsvaq; Râfa kingugpak

Iceland: Raekja; Stóri kampalampi

Italy: Gamberello boreale

Japan: Hokkoku aka ebi; Hokkai ebi

Netherlands: Noorse garnaal

Norway: Dypvannsreke; dyphavsreke

Portugal: Camarão

Spain: Camarón

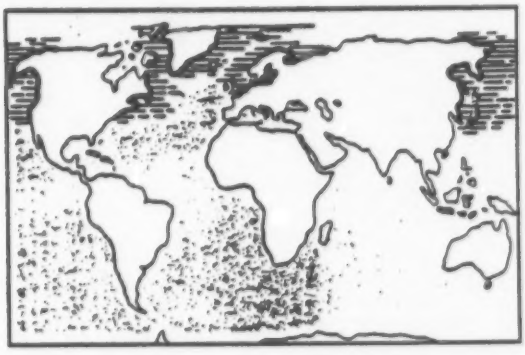
Sweden: Nordhavsräka

United Kingdom: Pink shrimp; Deepwater prawn

U.S.A.: Northern shrimp; Alaska shrimp; Pink shrimp

Size: Northern shrimp grow to 165 mm (6.5 inches).

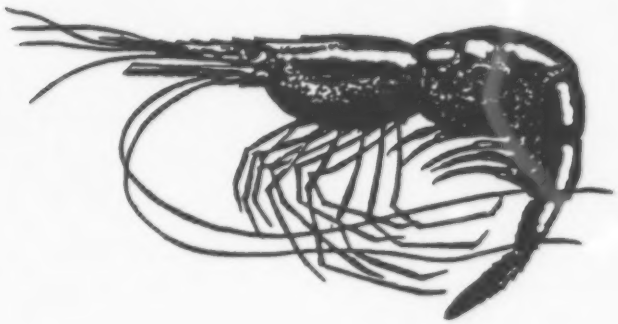
Distribution: The northern shrimp is found in most northern waters. In the



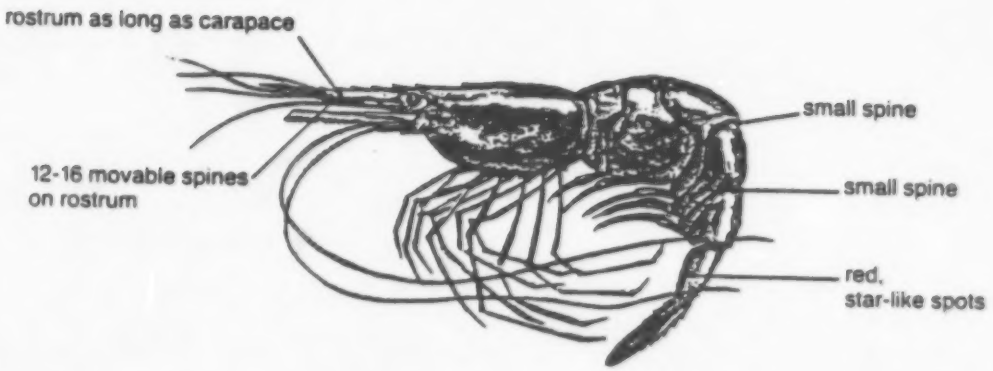
northern Atlantic its range is from Greenland south to Martha's Vineyard on the western side; and from Novaya Zemlya, Franz Josef Land and Spitsbergen south to Europe including Britain. The northern Pacific range in the east is from the Bering Sea and part of the Chukchi Sea south along the North American coast to Oregon (some specimens have been found as far south as San Diego). In the western Pacific it is found as far south as Hokkaido and Honshu, Japan, and South Korea to the latitude 35° 30′ N. The greatest concentrations of the species are off southern and western Scandinavia, western Greenland, the Gulf of Maine and in the north east Pacific to Oregon and Washington.

The Pacific shrimp is sometimes regarded as a sub-species, *P. borealis eous* but for all commercial purposes the Atlantic and Pacific versions are identical.

Northern shrimp prefer clay and mud bottoms in sea water at depths between 20 and 1380 meters (65 to 4,500 feet).



Pandalus borealis



Comments: With the possible exception of *Crangon crangon*, the common shrimp, this is the most important coldwater shrimp in world commerce. Valuable catches are recorded from the Pacific in Kodiak, Alaska, U.S.A., in Canada and in Korea. Atlantic catches are primarily landed in Norway and Greenland, but many other countries also participate in the fishery.

It has very sweet and firm meat and an attractive pink color. It is sometimes sold as pink cocktail shrimp. The color of both raw and cooked shrimp is similar. Sold whole raw, whole cooked and also cooked and peeled, northern shrimp catches fluctuate very widely from season to season and place to place. The fishery has expanded in Europe, with Iceland, Norway and Greenland competing for markets in Europe and North America. The average size of the shrimp offered for sale is between 40 and 55 per pound (88 to 120 per kilo) whole cooked and 250-350 per pound (550 to 770 per kilo) cooked and peeled.